OHIO STATE JOURNAL CO.,
COLUMBUS, O.,
Printers and Publishers,
1883.

1527

VETERINARY NOTES,

Printed from a corrected copy of Short-hand Notes, taken by R. W. STEWART, of an Entire Course of Lectures

DELIVERED BY

PROF. A. SMITH, V. S.,

ON THE

CAUSES, SYMPTOMS AND TREATMENT

OF THE

DISEASES OF DOMESTIC ANIMALS,

GIVEN BEFORE THE CLASS OF VETERINARY STUDENTS AT THE

ONTARIO VETERINARY COLLEGE,

OF TORONTO, CANADA,

During the Session of 1881-82.

VETERINARY NOTES.

ORGANS OF RESPIRATION.

The horse breathes only through the nostrils. These organs are, first, nasal openings; second, nasal chambers and sinuses; third, pharynx; fourth, larynx; fifth, trachea; sixth, bronchi; seventh, bronchial tubes; eighth, the lungs. There are two nasal openings, the right and left, and are divided by the nasal peak, to which is attached the nasal cartilage. External is the skin, internal to it are the muscles. The internal part of the chambers is covered with a fine thin covering. Superior to the inferior commissure is the false nostril; the small opening inside of the nostril is the eluctus nasi. The nasal chambers are separated by the cartilaginous septum nasi. It separates the right from the left chamber. In each nasal chamber we have two bones called turbinated bones, which divide the nasal chambers into three parts; so the chambers are not one continuous chamber. Each chamber is lined with mucous membrane (in fact all open chambers are lined with mucous membrane); this is called schneiderian or pituitary membrane; it is continuous with the skin, and also with that of the several sinuses. The sinuses of the head are the frontal, superior maxillary, ethmoid and sphenoid. They are perhaps, for two purposes—to lighten the head and protect the lungs. The larynx is a musculo cartilaginous box, held in its place by muscles, bones and trachea. The cartilages of the larynx are cricoid, thyroid, epiglottis, two arytenoid and two cuneiform. The cricoid surrounds the trachea; the thyroid is shieldlike; it is called Adam's apple, the epiglottis or pot-lid; the arytenoid is ewer shaped; the cuneiform are false vocal cords internal to the larnyx.

The muscles of the larnyx regulate the passage of air into the lungs. The glottal opening is in the centre of the larynx. The mucous membrane of the larynx is extremely sensitive. The larynx is well supplied with nerves, superior and inferior laryngeal. The trachea is composed of a number of incomplete rings, which are attached by ligamentous attachment; the mucous membrane of the trahea is not so sensitive as that of the larnyx. The trachea terminates in the right and left bronchi.

Catarrh means a running or discharge from the mucous membrane of the nose and the sinuses of the same; it consists of an inflammation of the mucous membrane of the nose, preceded by congestion. Slight congestion takes place, a peculiar dryness and irritation, which gives way to a discharge of a watery nature, which becomes white and then yellow, varying according to the severity of the case.

Causes.—The most common, perhaps, is exposure, or sudden changes

of temperature; standing in a draft; having been driven when in poor condition, when system is weakened.

Symptoms. — Slight dullness; may not take food very well; coat staring to some extent; pulse not much effected; throat becomes sore; after congestion passes off exudation takes place, followed by the discharge, and it may be very profuse, but it must not alarm you. There is generally impaired secretion of urine; breathing not much affected in many cases. We also have a discharge from the nose in other diseases, such as influenza, glanders, etc.

Treatment is simple. Give plenty of good, pure air; place in a comfortable box, well ventilated, and if the weather is cold blanket him accordingly; use nitrate of potash, two, four or six drachms, two or three times a day. One to two ounces nitrous ether, with one or two ounces laudanum, may arrest the attack in the first stages, or you may have to give a dose of purgative medicine, but be very careful in giving purgative medicine in diseases of the respiratory organs. Bathe the nostrils with warm water and allow him to inhale steam. Just allow it to pass into the nostrils, or use a nose bag, but allow plenty of pure air. If a cough is present, stimulate the throat with equal parts of ammonia, turpentine and oil, but if it is a very thin-skinned animal you may use less turpentine and ammonia and more oil, or mustard may be used. Give laxative food, but do not let the animal run down in condition too much. If the discharge from the nose runs too long, it may be arrested by the use of sulphate of iron, one to two drachms two or three times a day, or chlorate of potash, one to two drachms two or three times a day.

Laryngitis, sore throat. Inflammation of the throat occurs in a variety of forms, and sometimes terminates fatally in a very short time.

Causes.—Similar to those of catarrh, exposure; a number of horses kept in the same stable, or being kept in underground stables, or it may be an epizootic disease; that is, it attacks a number of animals at the same time, and it is quite difficult to say just what causes it in this way. It may occur from injury from balling with a stick, etc.

Symptoms.—First, dullness and swelling, easily noticed if the animal attempts to drink; water may be expelled through the nostrils, owing to the conformation of the horse. Pressure upon the throat produces pain. The pulse varies much; if it is very quick, and the animal cannot swallow, you have a very severe case. The mouth is generally hot, with a peculiar sticky sensation; the tongue dryer than natural; the breathing oppressed more or less, especially if the mucous membrane of the glottal opening is severely affected. Increased respiration, secretions generally impaired, bowels costive and urine scanty. In one or two days there will be a discharge from the mouth, and in acute cases it is a favorable symptom; it generally disappears in from four to ten days, but the animal should not be put to hard work for some time. It may terminate in roaring or bronchitis.

Treatment—Plenty of pure air is very necessary; if the feet and legs are cold, have them well hand-rubbed and bandaged. Give nitrate of potash and chlorate of potash. Be very careful in giving a drench; give chlorate of potash, two to four drachms in tepid water two or three times a day. Use judicious counter irritation; equal parts of ammonia, turpentine and oil; or rub mustard well into the skin and wash off in two or three hours, or it may be necessary to use stronger

remedies, such as biniodide of mercury or cantharides. If the breathing is very difficult, you may in some cases give inhalation of chloroform; give any food that the animal will take well; but if he will eat soft food it is the best. Give plenty of cold water. And it is sometimes necessary to perform the operation of tracheotomy; and there are other remedies you may use. You may find benefit from the use of camphor one drachm, tincture belladonna one-half drachm, opium one-half drachm, or digitalis one-half drachm, nitrate of potash two drachms, licorice two drachms, ipecacuanha one-half drachm. If a cough is present use counter irritation, and give iodide of potassium one drachm, morning and night.

Nasal Gleet, chronic catarrh, or ozaena. There is a glarey discharge from one or both nostrils. It is a sub-acute inflammation; the frontal or maxillary sinuses are the parts effected. The discharge varies according to the length of time and to the seat of the disease.

Causes.—Neglected catarrh, especially if exposed to cold and not allowed a sufficient amount of food. Exposure by running to a strawstack, etc., or an injury to the frontal sinus if sufficient to fracture the bone or even to injure the blood vessels inside of the bone, or from a carious tooth. Nasal gleet is a symptom of bad teeth, or of inspissated or dried pus. A tumor may produce it, or the introduction of a foreign substance into the nasal chambers, by endeavoring to swallow something and expelling it into the nasal chambers.

Symptoms.—It is sometimes mistaken for glanders; first a discharge from the nostrils; it may be of a whitish or yellowish color, which may be retained for some time in the nostril and then be expelled in considerable quantities. Look at the nose; the mucous membrane may be reddened or of a yellow hue, but no ulcerated patches, as in glanders. There may be swelling of the lymphatic glands, especially if it comes from a diseased tooth; the animal may continue in pretty good spirits, and may work pretty well. If the frontal sinuses are affected, you can detect it by the sound, by concussion, sounds being different in empty and in full sinuses. The animal becomes lean in flesh; it is called hide-bound, the discharge, if from a case of long standing, has a fetid smell; in glanders it is not so fetid, and the discharge is of a more greenish color. Always examine as to the state of the teeth.

Treatment is somewhat tedious. Keep the animal well fed, wash the nostrils once or twice a day, give plenty of pure air and some exercise, use sulphate of iron, one, two or three drachms once or twice a day, iodide of potassium, sulphate of copper, or balsam of copaiva. The best preparation of iron is iodide of iron. In some cases counter irritation is of use. Use biniodide of mercury. I have but little faith in injections into the nostrils. As a general thing no purgative is required. It may be necessary to trephine and allow the matter to pass out. Keep the opening well opened, inject carbolic acid, sulphate of copper, etc. If it is from a carious tooth, remove it. Sulphate of copper two drachms, cantharides five grains, made into a ball and given once or twice a day, or sulphate of iron one drachm, arsenic three to five grains, strychnine two grains, or substitute nux vomica for the strychnine.

Thyroid glands are ductless glands. Enlargements of these are called bronchocele; it may vary from the size of a pigeon's egg to the size of a man's hand. It is hypertrophy of the thyroid glands. It is easily detected, and does not often interfere with the animal in any way.

Treatment.—Iodine and iodide of potassium one part to four or six of lard; or you may dissect them out, but be careful, as the carotid artery is very near; but if you do cut it you can ligature it. It may be necessary sometimes to use biniodide of mercury, or if cysts are formed you may puncture them.

Croup, or false membrane in the throat of the horse, producing extremly difficult breathing; however such cases are very rare.

Abcesses of the turbinated bones.

Treatment is to trephine, and let the matter escape.

Tumors, or nasal polypi, are usually of a fibrous character; there is generally a small neck, which is attached to the mucous membrane; they may extend almost down into the nasal opening. It is not so common in horses as in man.

Causes.—They may come from some change in the system. It is a tumor, which does not grow again if it is removed.

Treatment.—If it is small it is better to leave it alone, but if it interferes with respiration it may be necessary to remove it, just with a pair of forceps if it is near the nasal opening. It is sometimes formed back in the pharynx, which is more serious than nasal polypi; it may not do much injury, and it may interfere with the larynx.

Symptoms are rather peculiar. The animal has difficulty in breathing; is subject to symptoms of suffocation; may fall down, get up again and for a time appear all right. There may, after this, be a discharge of blood from the nostrils. In such a case put the hand well back in the mouth and make a careful examination.

Treatment.—According to your works you would remove it, but my experience is that they are very difficult to remove; but it may have a very well marked neck and you may in such a case remove it. I have had some experience, and there is much hemorrhage.

Tumors of a cheesy consistency, but not polypi. When you make an examination you may think it is of a fibrous character, but it is of a fluctuating or flabby character, and you know by this that it contains matter of some kind. It is best treated by making an incision, and squeezing this matter out, and then treat as an ordinary injury.

Ulceration of the arytenoid cartilage has been noticed, and may result from acute laryngitis.

Symptoms.—It is difficult to detect, there is a discharge from the nose, more when the animal is eating. The animal falls off greatly in condition, and coughs.

Treatment.—Nothing can be done for it.

Thickening of the Mucous Membrane of the nose causes impaired breathing, a kind of snuffling up the nose. Give some such thing as nitrate or chlorate of potash.

Chronic Cough.—It is called this when no other disease can be seen. There are different kinds of cough: the dry; the humid, which is free and moist; the deep hollow, such as is found in heaves, or

broken wind; the suppressed cough, in which the animal tries to suppress it, for it appears to cause great pain; this is found in pleurisy.

Chronic cough may result from laryngitis. It is an indication of broken wind or heaves. There is some derangement in the pneumogastric nerve. It is aggravated much by changes in the temperature; it is shown after drinking or eating, or being brought from the stable, and although it does not seem to hurt the animal much, you must look upon it with a certain amount of suspicion. Pressure upon the larynx will cause him to cough.

Treatment must vary according to cause, or what you think is the cause. Iodide of potassium, or mercurial ointment, tartar emetic may be given—one or two drachms morning or night; or camphor, opium and digitalis made into a ball and given twice a day. You may use belladonna.

Roaring generally goes under the name of heaves, or broken wind. It may be produced by various causes. You may have whistling or blowing, etc. A whistler is not so serious as one that makes a loud roaring noise. Roaring may be defined as breathing with a loud and unnatural sound upon any violent exertion. There is more air passing into the nostrils than can pass into the lungs, and this is due to a wasting of the muscles of the larynx. The air acts upon the vocal cords, producing this peculiar sound. The muscles are more wasted upon the left side than they are on the right. Roaring may arise from a disease of the turbinated bone, or from a tumor of an osseous character in the nasal chambers, or from a foreign body in the nasal chambers, but five out of every six result from wasting of the muscles of the larynx.

Causes.—It is caused by laryngitis, strangles and influenza; but is generally hereditary. It may be from some lesion of the pneumogastric nerve, or from tight reining. It generally comes after strangles or laryngitis, by being put to fast work too soon after recovery. Horses with extremely long necks and a narrow submaxillary space are very apt to become roarers.

Symptoms.—As long as you do not excite the animal he is almost free from it, but if you work him hard or drive him, he will show it quickly.

Treatment.—If once well established, it is incurable; but you may palliate it by giving certain kinds of food. If it results from thickening of the mucous membrane, give iodide of potassium; or you may use counter irritation. Whistling, wheezing, etc., are only modified symptoms of roaring. The muscles involved in roaring are the crico-arytenoidens, posticus and lateralis arytenoidens and thyroarytenoidens. It may come from nervous influences.

Spasms of the Larynx.—Most likely to occur in old horses.

Symptoms.—The animal is seized with a violent fit of coughing; may reel, stagger, and sometimes fall. You cannot detect anything wrong. In such a case give a mild laxative and bromide of potassium, and follow by nux vomica.

Epistaxis, or bleeding from the nose, is not very common, and usually proceeds from some injury, or is the result of violent exertion, rupturing some of the blood vessels. It is not very serious. The blood, as a general thing, issues from but one nostril, but it may come

from both. Horses in high condition, without much exercise, are more liable to this.

Treatment.—It must vary to a certain extent. If there is not much blood, just bathe with cold water, or you may inject the nose. But be very careful in injecting the nose of a horse, or you may have a more severe form. If in but one nostril, use tow with some styptic, as acetate of lead. Feed well and get the animal in proper condition.

Hemorrhage of the Lungs is generally symptomatic of some disease, and when it is, it is easily detected. It is produced by various causes, and may come from different sources—from the air cells, bronchial tubes, or from the substance of the lungs. Horses most likely to suffer, if in good health, are plethoric animals. It is not uncommon among the trotting and racing horses, and is generally the result of improper care or use. It may result from violent exertion, although the animal is in very good condition. Instead of escaping by the nose, the blood sometimes becomes extravasated in the substance of the lungs, producing serious results, as pneumonia, etc.

Symptoms.—There is not generally much difficulty in determining it. It generally comes from both nostrils, and the animal also coughs; respiration is quick; the animal weak; and there is some irritation. Apply the ear to the trachea, and you will hear a peculiar gurgling noise.

Treatment.—Keep the animal standing quiet; cover well in cold weather; and apply cold to the chest—cold water or ice. Be very careful with internal remedies; but after some time use styptics—use turpentine or acetate of lead, or the tincture of the chloride of iron, two or three drachms once or twice a day, or gallic acid one drachm, with one drachm of opium. If the legs are cold, stimulate to some extent, and after some time administer stimulants, such as sweet spirits of niter. Inform t e owner of the nature of the case, and the great danger of exertion.

Congestion of the Lungs.—The lungs are supplied with two sets of blood vessels, the functional and nutritive. The functional are the pulmonary arteries and veins; the nutritive are the bronchial arteries and veins. The functional are the ones involved in congestion. Congestion consists in an increased amount of blood in the parts, and interferes with respiration. It is a forerunner of inflammation or pneumonia, and is the most common disease of the lungs.

Causes.—Rapid exertion when the animal is not in fit state, is the most common cause. It is a sequel of catarrh, and if worked too soon, it follows influenza as well as catarrh. It is sometimes produced by impure air, and possibly may be due to a sudden draft of air.

Symptoms vary some, according to the producing cause. If from fast work the symptoms are well marked, the animal will be sluggish, tremble in the flank; will have labored breathing, the nostrils dilated; oppressed pulse—which sometimes becomes very weak and indistinct; the mucous membrane of the eye and nose are reddened. By placing the ear to the side there will be heard a peculiar gurgling noise, showing that there is difficulty in the large bronchial tubes; ears and legs are cold, especially if the animal has been driven in the cold. But if it is a milder attack the symptoms are different. Suppose a horse, after having catarrh, is driven five or six miles, brought back and put into the stable. He refuses his food, trembles, or has rigors; ears and legs cold, mouth hot, pulse quick and

weak; by placing the ear to the inferior part of the trachea you hear those peculiar sounds; the animal persists in standing, but may lie down in exceptional cases; but will suddenly jump: there is congestion. Tympanitic condition of the bowels is a cause of congestion, by interfering with the action of the lungs. The pulmonary veins are generally the ones affected, if it be suddenly produced and terminate suddenly. If the horse has lived twenty-four to forty eight hours, there may be a great change; the lung may be in an entirely gangrenous condition; but you may not find so much change. If the animal dies more suddenly, the lungs may retain some of their characteristics—may swim in water. It is necessary, in case of a horse changing hands, to be very careful in giving your opinion in such a case, as it may be produced very quickly, indeed. The *post mortem* may reveal congestion, and that congestion not be the cause of death, especially if the horse has been lying on the ground for some time before death. It may be hypostatic congestion. So, I say, be careful.

Treatment.—It must be energetic. This is not a very fatal disease, but is rather a desirable disease to treat. Keep him in good fresh air (it is better to keep him out in the open air than in a close stable); keep him well covered; give stimulants; give one ounce of sulphuric or nitrous ether, with a little laudanum; bandage the extremities well; rub the body well; keep well warmed. You may bathe the limbs with warm water. If the animal is being relieved some, do not push stimulants too strongly, but if not relieved, give another dose. After some time give nitrate of potash, and give injection of soap and warm water, with a little turpentine, and in some cases you may try blood letting, but it is not now used to a very great extent. If a horse is in good condition and put to fast work and taken suddenly, in such a case you may take two or three quarts of blood; after which, give stimulants. But if the animal is suffering with catarrh, blood letting would be highly injurious. If you find the symptoms are relieved, and the pulse runs high, give Flemming's tincture of aconite; counter irritation; sometimes a hot application to the sides is of benefit. But there is no need of very powerful remedies. Wring a blanket from hot water and apply over the chest, and cover with a dry one; use carefully for some time; give regular exercise, but do not allow him to stand in a cold draft. Give gentian for a tonic. Allow plenty of cold water—not too much at a time, but give often. He is likely to suffer from another attack unless gotten in good condition, after which he will not be so likely to be attacked again.

Pneumonia or Inflammation of the Lungs.—It may occur in either the acute or chronic form. It may affect both or only one lung, or a part of the lung, or the entire lung. It is inflammation of the lung substance or parenchyma. It is not at all uncommon. It is found in connection with other diseases of the lungs, especially the pleura, for the pleura covers the lung very closely, and if both the pleura and lung are affected, then it is pleuro-pneumonia. Inflammation affects the substance of the lungs; the nutrient vessels in it are first affected, especially if it does not come on very suddenly. There are several stages of the disease, and it may terminate fatally at any of these stages. There is arterial congestion, in which the arteries become congested (Splenization), for in *post mortem* it presents the appearance of the spleen; a kind of frothy fluid issues from

the lung; the lung first becomes loaded with blood and bloody serum. If in this stage of the disease there is still crepitation, the lung has not entirely lost its natural characteristics, for it will swim in water. In the third stage the lung is much changed; there is an exudation which does not liquify; the cells are destroyed to a great extent; the lung becomes somewhat solid; the *post mortem* reveals a hepatized condition; the lung will now sink in water. It is sometimes called red hepatization, in contra-distinction to gray hepatization, or diffused suppuration. The fourth stage is gray hepatization or diffuse suppuration, and presents a gray appearance; is soft and pulpy, except in the ox.

Causes are predisposing and exciting; constitutional; and plethora; improper ventilation; sudden changes in temperature (the weather in the fall of the year is more likely to produce it than the cold of winter); placing the horse in a warm stable, and then turning him out to pasture; clipping, and then exposing to the cold. It is also the result of neglected catarrh; being driven while suffering from catarrh, etc. Diseases of the air passages are likely to terminate in pneumonia; allowing the horse to stand in a shed where there is a draft. It will occur in well but improperly ventilated stables, such as standing the horse between two large doors; it is produced by inhalation of smoke, but this is not so likely to produce pneumonia as bronchitis; the improper administration of medicine producing bronchitis, and then pneumonia. It is more likely to occur in young horses than in old ones.

Symptoms.—The careful practitioner is but little troubled in detecting this disease. It is usually brought on by shivering; when the shivering ceases heat takes place; ears and legs cold, and then hot or natural temperature (the same in pleurisy); mouth hot and sticky; the breathing slightly affected; the pulse is what is called an oppressed pulse; it is quick—maybe full. The horse as a general thing persists in standing, for the reason that it gives him more ease than any other position, but there are exceptions to this rule. The eyes have a glassy appearance; the conjunctiva is injected; there is a peculiar flapping of the nostrils; a heavy, sighing, breathing; and one symptom that occasionally misleads is constipation of the bowels; the feces are covered with mucous or slime; by placing the ear to the chest, crepitation can be heard. It is a good symptom to see the animal look around him freely. The horse desires pure air, which you can determine by letting him loose, and he will go to the open door. The respiratory movements vary to a certain extent, but not so much as might be supposed; the horse breathes about ten times per minute, but it may vary to some extent. In pneumonia these movements are increased more or less, but pneumonia is a disease that often goes on to a considerable extent without showing any violent symptoms. Auscultation can either be detected by placing the ear to the chest or by means of a stethoscope. There are certain sounds; if the animal be excited, you will hear a peculiar sound [abnormal sounds are quite difficult to describe]. Use percussion; tapping the chest, there will be a cresonant sound, but if hepatization is present there will be a dull sound. Place the ear to the chest and you will hear a crepitating or rumbling sound. If arterial injection has taken place, then you may have crepitation very well marked. The first sound is something like rubbing the hair between the thumb and finger near the ear; by-and-by when exudation takes place there will be no sound at all over

the diseased part (there will be sound near the diseased part, but not directly over it); the pulse becomes quick— one hundred beats a minute or more—increasing much upon exciting the animal. The breathing and flapping of the nostrils increase; there is a discharge from the nose, of a reddish brown color, which is a very bad sign; appetite entirely gone; breath very fetid; will not lie down; notices nothing; and, as death approaches, the mouth becomes cold; the pulse very indistinct; perhaps now lies down; breathing very much increased; gets up, perhaps; falls and expires. Death may occur in from ten to twenty hours. If the animal dies in from twelve to twenty-four hours, it is generally from congestion. If the case is about to terminate favorably the animal lifts the head, looks around some, and begins to eat. It is rather satisfactorily treated.

Treatment.—Clothe the body according to the season of the year. If the attack comes from some well marked cause in an animal in good condition, use sedatives: aconite, Flemming's tincture—six to eight drops, Flemming's tincture being much stronger than other tinctures; in some cases a moderate amount of blood letting may be of benefit, but never if the animal is of a weak habit. Give small dose of nitrate of potash, ten to twelve drachms in twenty-four hours. Endeavor to overcome distressing symptoms by giving the tincture of opium—half ounce or even one ounce. Encourage the animal to take a certain amount of food, such as a bran mash, but if such will not be taken then give anything the animal will take; but do not push too much food into him. After the sedative, and relief is obtained, give stimulants: nitrous ether, milk, whisky, etc. He may take it in cold water; if so, it is the best way to give it. There are other remedies. There is difference of opinion as to counter irritation, whether it should be used or not. I think judicious counter irritation is attended with benefit. Apply cloths wrung out of hot water, or mustard poultices. There are different ways of applying mustard. The best is the same as it is applied to human patients; leave on just as your judgment dictates. It is necessary to know just when to stop giving medicine. When the animal is recovering call the bowels to action by the judicious use of loosening diet. If it is the result of catarrh, it is not necessary to give sedatives. If a cough is present, give digitalis and opium. But digitalis is a medicine you must be very careful with.

Pleurisy is inflammation of the pleura, and frequently exists in connection with pneumonia. Acute pleurisy is a pretty serious disease, and apt to terminate fatally, or injure the animal. Death does not generally take place before the third or fourth day. If of long standing, hydrothorax is the result.

Inflammation of the Textures Involving the Pleura.—If the animal dies in the first stages, red streaks will be seen in the pleura. There is a tendency to serous exudation, or exudation of a serous character, but we have an exudation of a fibrinous character, and also a false membrane. This is more likely to take place in cattle than in horses, and it will form in from twenty-four to forty-eight hours. It is astonishing what a change will take place in this time. This exudation is soon taken up by the blood vessels, if the animal begins to convalesce. With hydrothorax there are shreds of lymph, or yellow clots of fibers, floating in the water of the chest. You may

find that the outer surface of the lung is affected, but the internal part may appear pretty sound.

Causes are similar to those of pneumonia. Exposure to cold, or standing in a large stable between two large doors, through which a heavy draft passes; by washing the limbs or body when the horse is warm and not drying immediately, which has a tendency to drive the blood from the surface; or from injury to the side, which may or may not fracture, but may produce pleurisy. It is usually ushered in with rigors, pulse quick and wiry, fuller than in pnuemonia and of this wiry character; the animal appears in very great pain, and, although breathing violently, will lie down. If you make him cough, he will endeavor to suppress it as much as possible. This is different from lung fever. Ears and extremities cold, or one leg warm and another cold, and *vice versa*; quick breathing; a hollow line extending along the inferior border of the false ribs; there is a rasping sound; the animal endeavors to expand the chest as much as possible, hence the line. Auscultation reveals a grating sound; after a time this will cease—just as soon as the exudation takes place. If you attempt concussion, the animal evinces great pain; if you attempt to turn him around he will groan from pain. In fifteen or twenty minutes the animal shows symptoms of returning health; the grating sound ceases, and you may be deceived in this; the pulse, instead of becoming slower and stronger, is running up; although exudation has taken place, it is to such an extent that the absorbents cannot take it up and distribute it, and there will be hydrothorax. There may be fluid in only one side, or it may pass from one side to the other. Pleurisy is apt to supervene influenza where the acute symptoms will not be so well marked as those I have given you, but if of some standing, there will be other symptoms; irregular pulse; oedematus swelling of the limbs and belly; a kind of dropsical swelling from impaired health and circulation.

Treatment is not very different from other chest diseases. You might try taking blood; put hot cloths to the side, or mustard, or take a piece of sheet iron and warm and place upon the side, and put a blanket over this; if in a very cold stable, do not apply wet cloths; give tincture of aconite; and you will find great benefit from the use of colchicum—one-half drachm to one drachm. An excellent remedy is liquor, acetate of ammonia, or nitrous ether; use diuretics freely, and use tonics; if there is great pain give opium—one or two drachms, or hypodermic injections of acetate of morphia; or you may use digitalis—one-half drachm to one drachm; or belladonna; give stimulants, and endeavor to carry off the products of exudation.

Results of Pleurisy.—The natural result is water in the chest, and if it collects to a large extent, hydrothorax is the result; there may be several pails full of fluid in the thoracic cavity. If you have a well marked case of hydrothorax (say the cavity one-half full or such a matter), you have a very serious case.

Symptoms.—There is great difficulty in breathing; flapping of the nostrils; the eyes clear—of rather a natural appearance; venous regurgitation of the blood in the jugular vein. No sound is heard by applying the ear to the chest, except above the fluid. The body is much affected; legs swelled; also around the udder, sheath, etc. The animal keeps the head to the door if permitted, showing his desire for oxygen; ears and legs cold. If you are called to see an animal that

has had pleurisy and the above symptoms are presented, you can make up your mind that it is hydrothorax.

Treatment.—Give stimulants, diuretics, and tonics freely. Endeavor to get the animal to eat the very best of food, not bran mashes, etc., but the very best of food. You may overcome the disease, but there is no specific for it; you may try tapping, which is sometimes attended with success, but not so successful as in the human practice; you puncture between the eighth and ninth ribs. This operation is called paracentisis. Keep the animal quiet, and endeavor to build up his condition.

Pleuro-Pneumonia of the horse, or inflammation of the pleura and lungs. It always occurs in a sporadic form. It is not contagious, as in cattle.

Causes are similar to those mentioned, and if influenza prevails, pleuro-pneumonia also prevails. The

Symptoms are generally pretty plain; the animal persists in standing; pulse quickened and wiry.

Treatment.—Just the same as in pneumonia. I favor a form in giving stimulants instead of sedatives.

Recapitulation.—Pressure upon the intercostal spaces causes pain; at first there is dryness of the pleural surfaces; then more or less exudation; there may be adhesion of the pleura costalis and pleura pulmonalis. Give opiate to relieve pain. May give one or one and a half grains of acetate of morphia hypodermically. If once hydrothorax is well established, and results from pleurisy, you may do something for it, but if it results from pleuro-pneumonia it is almost a hopeless case.

Bronchitis may accompany some of the chest affections already mentioned. The trachea terminates in the bronchi, these in the bronchial tubes, and these in the air cells. Bronchitis is inflammation of the bronchial tubes—there is acute and chronic. If you suffer from a sore throat, and have some difficulty in the throat, the soreness extending down, it is acute bronchitis, or there may be mechanical bronchitis in the horse from a foreign substance in the throat, or from irritating medicines; from balling with a stick, etc.

Symptoms.—A peculiar dryness; in health there is always a fluid or secretion in the throat; in inflammation this is dried up. There is dryness of the mucous membranes; increased breathing to a certain extent; there is a peculiar loud breathing or snoring, which can be discovered by auscultation. The second result is an exudation which changes the loud breathing to some extent. The horse does not expectorate as much as man, but no doubt it does come up and is swallowed. If you listen now you will hear this sound to a certain extent, but not so well defined as at first; but if you have very violent or difficult breathing, a peculiar hissing or whistling sound, there is inflammation of the air cells, or the cells are plugged up to a certain extent, and this may lead to hepatization of the lung by affecting the lung tissue. Mouth hot, and the pulse not hard but soft. Capillary bronchitis is speedily followed by great depression; there is coldness of the extremities, which is symptomatic of all such diseases; it may terminate fatally very quickly, or it may recover as quickly.

Causes.—Driving the horse when hot or in poor condition; inhala-

tion of smoke; sudden changes in temperature, etc. Causes of the mechanical form are choking, regurgitating of food and passing it into the trachea; the accumulation of gas in the intestines and throwing it up in the oesophagus, etc. Bronchitis is oftener seen in the city from these causes than in the country.

Treatment.—You may find benefit from a few drops of aconite, but you must be very careful in giving sedatives. You may find great benefit from giving opium in the first stages—one or two ounces of the tincture; or from hot applications, hot water, mustard, etc. Nitrate of potath is an invaluable remedy in chest diseases; if there is great depression you may use stimulants, but be very careful in drenching an animal or in forcing food in this disease. You may give whisky, ale, beer, etc. After the acute stage has passed there is a discharge from the nose (and is not a very bad sign). Give nitrate of potash; and you will find benefit from small doses of tartar emetic—two to four drachms; or you may use liquor acetate of ammonia; or you may give one or two drachms of the carbonate of ammonia, dissolved in water, or given in a ball of linseed meal. There is also a parasitic bronchitis, which may be noticed by-and-by.

Broken Wind, asthma, heaves, etc. This is common among Canadian horses.

Pathology.—There are a great many theories brought forth with regard to it. It is generally, I believe, brought on by some lesion of the pneumogastric nerve. Pneumonia and other such affections may produce it. An animal can generally do moderate work. Hepatization of the lungs, heart disease, etc., is generally the result, and not the cause, of heaves. Emphysema of the lungs does sometimes produce it, in which cases the air may pass in between the lobules of the lungs, or the air cells may be ruptured, and two or more become one, by rupture of their walls. Inflammation of the bronchial tubes may produce broken wind, but it is generally from some lesion of the pneumogastric nerve which sends branches to the lungs, trachea, stomach, &c. The small air tubes are surrounded by involuntary muscular tissue, which is used in expelling the air, and is to some extent under the control of the pneumogastric nerve. The nerve loses its power of contracting the lungs. The

Causes that produce this condition are often the result of injudicious feeding, and fast exertion after injudicious feeding, which causes an increased determination of blood to the lungs; often by feeding upon dusty food, or keeping the stomach in a greatly distended condition; from chopped food; however, good chopped food is the best food. We find it is comparatively rare in our cavalry horses, as they are fed upon the very best of food, and before being put to fast exertion are prepared for that exertion. It is easily detected in a well established case. There is a peculiar way of breathing, a short inspiration with a sort of jerk. The nostrils are expanded; the abdominal muscles are sometimes contracted so as to show a line along the belly; the animal is said to be bellied from being a very big eater; gas passing up through the nose was at one time thought to produce it. On a damp, hot, sultry day the symptoms are greatly increased and may be very alarming, and might lead to suppose the animal was suffering from inflammation of the lungs, but the pulse is not quickened, as in pneumonia—heaves being a non-inflammatory disease; or you may see such symptoms in a pregnant

mare, and might think the animal would live but a few hours, but the pulse is found to be almost natural. There is in heaves a loud, hacking, painful cough; it is a deep, internal, sonorous cough, but gets easier after being taken out and exercised. If an animal has been fed properly, and you give him a feed or two of poor or bad food, he will show distressing symptoms. Clover hay is very bad food for such an animal. You must be on the lookout for this, especially in heavy horses. In examining for soundness, give the horse a gallop. The symptoms may be relieved by certain modes of feeding: say do not give any food or water for some time. If you suspect such a thing, give the animal a pail of water or feed of hay, and then gallop. A large dose of sedative medicine will allay the symptoms. It can be mechanically relieved by giving solid lead.

Treatment.—If a confirmed case, it is incurable, but it may be palliated by regular feeding, and never allowing the animal to overload the stomach. Give the very best of food—chopped feed is the best; or you may give certain remedies. Give sedatives, camphor, opium and digitalis (about one drachm each); given every day for three or four days; iodide of potassium, arsenic or iron. You may give a dose of purgative medicine to relieve quickly. It is generally a dietetic disease. Nux vomica is an excellent remedy. In the earlier stages you may effect a cure, but if it is confirmed there is no cure for it.

Recapitulation.—A poor feeder very seldom has the heaves. Race horses seldom have the heaves, for they are properly fed. A foreign body more frequently passes into the right side than into the left. If broken wind comes from catarrh, use stimulants; if acute, use sedatives. The pathology of broken wind differs to some extent; there may be a corrugated condition of the mucous membrane of the bronchial tubes. It is a sequel of bronchitis or severe strangles; there is a peculiar movement in the act of expiration. If you are called to treat a case, use the remedies given, or if it is a recent case you may blister along the lower part of the trachea.

Pleurodynia.—This is not very common, but is sometimes met with. It is a rheumatic condition of the muscles of the thoracic walls. It is quite possible that the nerves are affected, but it is generally a rheumatic affection.

Causes.—Exposure; especially when recovering from other diseases, more especially pleurisy.

Symptoms.—Great pain and difficult breathing; shows symptoms the same as in pleurisy, but pressure upon the intercostal spaces produces more pain than in pleurisy; the circulation but very little affected; there is no grating sound, as in pleurisy.

Treatment.—It varies according to circumstances. If in a warm place, use cloths wrung out of hot water; stimulate the sides with liniment (camphor, opium, and arnica, equal parts, well rubbed into the sides), and then cover the animal up; or, you may find benefit from an opiate. For the after treatment, use colchicum and iodide of potassium, and if the bowels are costive give injections. Use tonics.

Lesions of the Diaphragm.—The diaphragm is affected in many ways, and oftener, perhaps, than we are aware.

Spasms of the Diaphragm.—All muscles are subject to

spasms. This is serious while it lasts, and may produce death very quickly, for air cannot be taken in in sufficient amount to supply the lungs.

Causes.—It is the result of severe exertion when the animal is not in condition to undergo exertion. I have never seen a case where the animal was kept in the stable. It is called thumps. The girth of the saddle being too tight may produce it. It may come upon a horse in good condition, but is more likely to attack one in poor condition. Eating too much before being put to violent exertion. It comes very easily, especially if the animal is just recovering from some other disease.

Symptoms.—It gives rise to a thumping, or you might think it was palpitation of the heart, but examine closely and you will find that the heart is not much affected; the sound is further back; the symptoms are very violent; the animal sweats freely; there is a peculiar noise and motion, as if some one were within striking with a hammer.

Treatment.—If it is an ordinary case—not very severe—give an anti-spasmodic, nitre and laudunum—just the same as a colic drench; do not give hypodermic injections, for it may do damage; blanket well; give plenty of pure air; but if it is a more severe case, and is threatened with congestion of the lungs, you may take three, or four, five or six quarts of blood if the horse was in good condition; follow by anti-spasmodics; use turpentine; and, as soon as the animal can take it, give plenty of cold water; after treatment, get the animal in good condition; feed well and give regular exercise. This disease may produce death by congestion of the lungs, so you must be careful in giving hypodermic injections; owing to the impaired condition of the heart, it might be interfered with.

Rupture of the Diaphragm.—If it is of any great extent, death soon relieves the animal; but there may be but a very small rupture, and it may recover; it frequently occurs after death; there may be very severe symptoms of colic, and rupture be the result; or violent exertion may produce it. There are no general

Symptoms by which you can distinguish this easily. A frothy spume may issue from the nose. When you find rupture of the diaphragm in *post mortem*, you may be called upon to tell whether it occurred during life or after death, and if there is extravasation of blood, you may say it occurred before death; but if there is no extravasation of blood, then it occurred after death. Some think it never occurs before death, but I think it does.

Inflammation of the Trachea.—Use counter irritation, sedatives, etc.; or sometimes stimulants.

Abnormal Growths.—In connection with tracheatomy, the cartilages take on an improper growth.

Recapitulation.—Pleura dynia, pain in the side, supervenes some debilitating disease, influenza, etc. Use counter irritation, hot water, anodyne, liniment, camphor, opium, etc. Spasms of the diaphragm generally results from fast, long-continued and violent exertion; difficult breathing; a loud, thumping sound of the parts, but not in connection with the heart; difficult respiration. If not relieved, may soon end in death. Give anti-spasmodics, and free access to the air; may have to place almost in the open air; may let some blood for

the purpose of relieving congestion. After-treatment: Give iodide of potassium or other such remedies. Rupture of the diaphragm in most cases is due to acute indigestion; throwing himself on the ground with great violence when in such a condition may rupture the diaphragm.

DISEASES OF THE AIR PASSAGES.

The air passages of cattle differ some from those of the horse.

Catarrh.—Cattle do not suffer from catarrh so readily as horses; it affects the nasal chambers and sinuses of the head; at first only the nasal chambers, but if allowed to continue it will extend and involve the nasal sinuses. It is generally brought on by a change in the temperature, but cattle are not so easily affected as horses. It is caused by running in the barn yard in winter, not getting food enough, etc.

Symptoms.—A discharge of matter from the nose; muzzle dry and rough; there is some fever and a cough is present; but not so easily excited as in the horse; pulse somewhat excited. There are two kinds; the malignant form appears in Europe, but not in America.

Treatment.—Give a gentle laxative; four or five ounces of epsom salts in about a quart of water, followed by nitrous ether, seems to check it. Another is nitrate of potash—half ounce, cream of tartar—one ounce. Take good care of the animal—the same as of the horse. If the discharge continues, use sulphate of iron (one ounce daily in two or three doses) for two or three days. It has a greater tendency to become chronic in the cow than in the horse. The horns may drop off. Catarrh gives rise to an imaginary disease called hollow horn. If an animal becomes debilitated there is more hollow in the horn than in health; but there is no such disease as hollow horn; one side is generally more affected than the other. In an animal suffering from a chronic disease, or in a very old animal, the sinuses of the head will be more fully developed than in a healthy or in a young animal.

Treatment.—Use remedies such as used in nasal gleet; or counter irritation. If there is much pain, the animal carries the head to one side. There is enlarged condition at the root of the horn from the accumulation of matter. You may make a hole at the lower part of the base of the horn with a small gimlet; or you may have a more severe case, and the horn so diseased as to allow it to fall off; take it off in such a case, and you can stop the hemorrhage with tow saturated with carbolic acid, etc. Cattle also suffer from

Pharyngitis and Laryngitis (generally compound), caused by exposure to the cold, etc., the same as in the horse, except from working. It may be due to tubercular deposits, to which high-bred cattle are more subject than ordinary cattle.

Symptoms.—Difficult breathing, loud and wheezing, slight swelling, pulse quickened, and rumination stops. It may result from choking, or from means resorted to to remove obstruction from the throat.

Treatment.—Give pure air; place in a box by itself; use nitrate of potash in larger doses than in the horse; get the bowels to work, by giving epsom salts. You may give hyoscyamus; use embrocations,

stronger than in the horse; two parts of turpentine, etc., to one of oil; or you may use croton oil. If the animal has apparently recovered from pharyngitis, and there is some difficulty in breathing, there is no doubt but there is some tubercular deposit present, and the disease will be likely to return or increase. If you treat such a case, use iodide of potassium, and counter irritation.

Tuberculosis.—Cattle suffer from internal abscesses in the larynx. There is great difficulty in breathing, although the animal may feed pretty well. There will be an enlargement, and there may be some external swelling. Examine, by means of the balling iron, and if it does not burst soon enough, you may puncture inside, and let the matter escape. Such cases are common, and external tumors are more common. On pressing upon the larynx and trachea, there is visible swelling, difficult breathing, loud wheezing, increased by running the animal a short distance; symptoms of suffocation. It is astonishing in what good condition an animal may be in, and at the same time be suffering from such tumors, so you must not expect to find them emaciated always.

Treatment.—Tumors are generally of a tubercular character. You will sometimes find a fibrous tumor, and in some cases, although you examine very carefully, if you will be more careful you will find in the center some amount of pus. You will perhaps think there is a fibrous tumor, and upon cutting into it, it will prove to be an abscess. I recommend a careful examination, for, in four cases out of five, you will find matter. In all such cases, open up carefully, for they are vascular to some extent. You may find benefit from a seaton, or from biniodide of mercury. But if it is from tubercular affection, there is no certainty of curing it. You may be able to dissect the tumors out, but if it is not well defined, and there is matter, let the matter out, and the animal will be relieved. Cattle suffer also from

Bronchitis.—Characterized by irregular wheezy breathing, which can generally be heard without much trouble; rumination ceases; pulse may be eighty or ninety beats per minute. Causes just similar to that of the horse.

Treatment.—Similar to that of the horse, but larger doses. There is one form in cattle that is not in horses.

Filaria Bronchitis.—Cattle and sheep more likely to have parasitic attacks than any other animals. This disease is oftener found in young cattle than in old, but it may affect both. In calves, it is called strongylus micrurus; in lambs it is strongylus filaria. It is usually found in the tissue of the bronchial tubes; and in sheep it is found embedded in the lung tissue, but is not generally so found in the calf. It is known as hoose. How does this worm get into the tubes? There are many theories, but I believe they find their way into the circulation. I do not think, as some do, that they pass in through the nose, for in such case it would excite the animal, and it would expel it; but it gets into the animal through the water, etc., and gets into the circulation, and finds its way into the mucous membrane of the bronchial tubes. It is more common in low lying ground, and is more common in some years than others, and in some times of the year than others.

Symptons.—Difficulty in breathing, a peculiar husky cough, rumination may not be suspended. There will be a discharge from the

nose; if you take this you may detect the parasites in it. It is rare that one animal is affected by itself, but many are affected at the same time.

Treatment of Parasitic Bronchitis.—Use anthelmintics; use turpentine with linseed oil. If it gets too severe, give rest, or you may use turpentine with milk; or you may use inhalation of sulphuric acid, by burning sulphur; or use chlorine gas, with caution. You may find benefit in after-treatment by giving a generous diet, and change of locality. If cattle that have been upon low ground, have them put upon high ground; bear this particularly in mind. If the parasites become embedded in the lung tissue, they will have been forming there for some time, perhaps before any notice was taken of them.

Influenza.—So named because it was formerly supposed to be influenced by the stars. It may appear in a very malignant form. It is very common among the horses of this country, and is of a specific character. It is a febrile disease, and involves different organs of the body, as the liver, lungs, heart, pleura, etc. The great central system is implicated, arising from some morbific matter or poison in the blood, the respiratory organs being oftener involved than any others. Cerebro-spinal meningitis may be said to be a different form of influenza. A great amount of talk could be brought forth, both as to how this poison gets into the system, and as to what kind of a poison it is that produces influenza. It may get ino the system in various ways. It is

Caused by some atmospheric influence; some condition that cannot be found out precisely. There is some difference of opinion as to whether it is contagious or not. It is better to keep the animal away from other animals, if convenient; but what operates upon one ainmal may operate upon a number at the same time. Such as the epizootic, which appeared in 1872. It could not be accounted for as of a contagious form. Influenza is more prevalent in the spring and autumn months, when the animals are changing their coats; but it may appear in an epizootic form—that is, it attacks a great many animals similarly at the same time. I will not now speak of these very severe epizootic forms, but will speak of it as seen more or less every year. In 1874 and 1878 it prevailed to a great extent, and as you see it in such cases it is more severe than in ordinary circumstances. It is, in all probability, caused by some peculiar atmospheric influences which exercise an injurious effect upon the animal. This may be said to be the exciting cause, but there are many other influences which may produce the disease. Ill-ventilated stables, the animal not receiving at the same time a sufficient supply of nutritive food, may produce it. It occurs in the most severe form in larger cities and in larger stables, and especially in under-ground stables, and may attack the great nervous centers. Experience tells us that if animals are compelled to breath bad air, and are not given sufficient exercise, they are more likely to have influenza; while one that is well exercised and well fed is not so susceptible; but all are subject to it.

Symptoms vary much, and depend upon the organ or organs most affected. The early symptoms are a dull, languid appearance; eats poorly, sweats freely upon the slightest exertion; coat somewhat staring and dirty-looking; mouth hot and dry; and there may be a cough. After a short time there will be well marked symptoms. The cough is easily excited by pressure upon the throat; the bowels usually costive. The feces passed after a few days are small, dry pellets.

The pulse considerably altered; generally a quick, weak pulse, varying from sixty to eighty beats per minute; but it may not be very quick. The dullness may be followed by more marked symptoms. The horse appears to be suffering from intense headache, and if caused to walk off, shows great signs of nervous depression, and appears so weak that you could almost throw him over. The pulse in such a case will be intermittent, showing that the poison was acting upon the nervous center, and not in the ordinary manner. In such a case the respiratory organs may not be affected so much as in other cases. Cerebro-spinal meningitis may be produced in this way, so that you will have various forms of influenza. In other cases, the breathing is very much affected, which is, perhaps, more perceptible at the nostrils than at the flank; the throat sore; the bronchial tubes soon become involved, and you hear a peculiar noise. The legs and ears change in temperature very much. They may be hot, and in an hour may be the normal temperature; then, again, cold, etc. The general temperature may be some increased, to 10.5°, perhaps. The eyes are sometimes affected, and so it is sometimes called pink eye, owing to the reddened condition of the eyes. A discharge from the nostrils is a favorable sign, if it is of a yellowish white color; but if it has a brownish red or rusty appearance, it is symptomatic of great depression. In some instances the breathing is increased, and blood is discharged from the nostrils. Pulse is changeable—a kind of false, irregular pulse, and such are very bad signs. In a great many cases the liver is functionally deranged, but there is not much organic change; in such a case there is yellowness of the mucous membrane of the mouth, eye, etc. Influenza may terminate in enteritis and death. If the liver is affected the bowels will be quite irregulars, costiveness and diarrhea alternating. Any of the secreting glands may be more or less affected, and it may assume another form, that of a dropsical form, in which the legs, sheath, udder and eyelids may present oedematous symptoms; and if in the latter stages it is a bad sign, but if in the first stages, and the swelling is confined to the legs, and but slight, it is rather favorable. Unless there is great fever present, and great depression, it is rather a good symptom, but if in the latter stages, it is from debility, and is apt to soon terminate in well marked disease of the lungs and pleura. If the lungs are affected, the pulse becomes weaker and is oppressed, and in the last stages the animal stands until death. It is more apt to produce subacute disease of the lungs and pleura. Owing to impaired functional power of the organ, effusion and suppuration takes place readily. If it is of a subacute character, effusion is much more than in a common case of pleurisy. The animal usually maintains a standing position in influenza; he may lie down, and when down the breathing is increased much, but if he is in an easy position, allow him to lie. It gives great relief, unless there is danger of suffocation. This disease may produce water in the pericardial sack. It also has a tendency to affect the joints. Your patient is perhaps convalescing, but you are called back, and perhaps will find him suffering from severe pain in some of the joints, and there may be rheumatic laminitis.

Treatment.—Give plenty of pure air, as in all such diseases. I cannot speak too strongly of this part of the treatment. Clothe the body according to the season of the year; well clothed in winter, the legs bandaged and hand-rubbed. Keep the blood in circulation as well as possible. Many people place the animal in a close stall or box, to

keep him warm, but this is not a good way to apply warmth. It would be better to turn loose than to keep him in a tight box. Use rational treatment, according as the comfort of your patient demands. Support the system, and assist nature to throw off the disease, for influenza will run its course in spite of medicine. Use potash and soda. Chlorate of potash is to be preferred, in one drachm doses two or three times a day; but if there is great fever, use nitrate of potash, which is preferable. Feed well on nutritive food; give some roots, such as carrots, in winter. Great care must be exercised in feeding the horse. If you give too much food he will not be so apt to eat it as if but little was given at a time; give small amounts of any kind of food; feed from the hand, etc. Use stimulants; liquor acetate of ammonia, two ounces; sweet spirits of nitre, one ounce, two or three times a day; or give whisky, ale, beer, etc.; but I give whisky in influenza. In severe cases you may have to restrict the diet, but not often. The secretions are impaired, and you will find benefit by getting the bowels to act by giving injections, and in very rare cases you may give a laxative; oil is preferable to aloes, but aloes may be given, two or three drachms; but be very careful in giving it in influenza, as it is likely to set up superpurgation. Give whisky and milk, or beef tea has been used by some of our graduates. Do not attempt to force food, for it only acts as an irritant. It is possible to have a case where a sedative is necessary, but I have seen but few such cases, and have seen some where it did great harm. The animal may get too much aconite, and show signs of poisoning, in which case stimulants would be of great use. Belladonna, calomel, opium and digitalis have been recommended, but I think the most of them have been injurious. You may use digitalis, if the breathing is difficult. You will find benefit from keeping up fomentations, if the bronchial tubes are affected, or the throat is sore, etc. You may use counter irritation. Influenza is not generally very fatal; but when bleeding, purging, etc., were resorted to, the mortality was very great. If an animal shows signs of approaching convalescence, the eye clear, the pulse firmer and slower, appetite returning, the body and limbs more of a natural temperature, etc., you may give sulphate of iron or quinine, or iodide of potassium. If the legs are much swollen, or the nervous centers are affected, give bromide of potassium or nux-vomica. After the fever has passed off, the chlorate of potash is, perhaps, the best.

Purpura Hemorrhagiea.—Purpura has been classified under different classes of diseases. It is a disease of a sporadic character. It is some putrid condition, or a charbonous affection of the blood. In this disease the capillary system is affected, especially of the skin and mucous membranes, and it is quite possible that many parts of the body may be affected. There may be blood extravasion in connection with the internal organs, probably spots on the mucous membrane, and also upon the skin, from which issues a sanguineous fluid. It is rather more frequent in the city than in the country, and more frequent in a season when influenza prevails.

Causes.—It is generally a sequel of some other disease, as influenza. It is due to some poison in the blood, which renders the blood more fluid, and prevents coagulation to some extent. If the animal is suffering from any disease, and exposed to the cold and vicissitudes of the weather, you need not be surprised on seeing purpura. The ani-

mal may do work well as long as the weather is good, but from certain changes in the weather purpura will develop readily. In such a case it frequently supervenes a mild attack of influenza. It may be produced very suddenly from being exposed, driving before entirely well, bad ventilation, bad grooming, etc. It may be due to other causes, and from being exposed to the debris of dead animals, but more frequently from bad ventilation, bad drainage, etc. It is seldom seen in an animal at pasture. It may come from strangles.

Symptoms very plain and very characteristic. There is generally no difficulty in detecting this disease. There is a slight swelling of the limb, more likely to be about the hocks. The swelling may disappear by exercise, but will soon return. The swelling presents a very abrupt appearance, nearly the same as if a string was tied around the limb; and swelling very quickly is symptomatic of purpura. Exudation takes place, in which, if on a white limb, you will see little red spots, from which liquid is oozing. The swelling is very painful and the entire limb may be swollen; small vescicles appear on the limb, and also in the mucous membranes, and it is well to look at the mucous membrane before giving your opinion, as you will no doubt detect these spots, which may extend to the lungs. These spots increase and may run into each other. The mucous membrane of the nose may become one mass of corrupt matter. The under lip may hang pendulous, which is due to want of nervous stimulus. If the nostrils are swelled very badly, and there is difficult breathing, and the animal is not able to take food, the symptoms are very bad. The pulse varies much. In some cases, although the swelling is very great, the pulse may not be more than forty, fifty, or sixty per minute. There may be a cough and a coffee colored discharge from the nostrils. The mouth and eyes become affected, and, together with the discharge from the nose, he is a loathsome object. In milder cases the appetite is retained, or the animal may take food one day and the next refuse it. The bowels costive, as a general thing, in the first stages of the disease, and the urine may be of a dark color; may even contain blood. There will be a peculiar dropsical swelling and these patechial spots, or it may first show itself in connection with the eyes, and there may be blood extravasion without external symptoms. It may affect the bowels, liver, lungs, etc. The swelling is due to extravasion of blood. A peculiarity of purpura is, that the swelling may disappear from one place and appear in some other part, which is difficult to account for. The animal usually stands, perhaps from difficulty in moving the limbs. It is necessary to watch the case closely, for the flies will attack him, and he will be filled with maggots. Sloughing may take place; the entire sheath, or patches upon the bo dy may slough off, and there may be paraphimosis. It influenza prevails, and you have swelling of the legs, examine very carefully.

Treatment.—The duration of this disease is from eight to thirty days. It generally takes about a month for an animal to completely recover. Place in a comfortable place. Give chlorate of potash, not for any stated properties, but from its action on the blood. If the bowels are costive, I recommend giving from one to two ounces of turpentine in six or eight ounces of oil. Afterwards give as much as one or one-and-a half ounces of chlorate of potash during twenty-four hours; give it in his water, as there may be difficulty in giving a drench. Give, as a styptic, the tincture of the chloride of iron, once or twice a day, in doses of two or three drachms. If the pulse is

strong and the appetite good, repeat the turpentine and oil in one or two days; and I have seen cases where a purgative was given with advantage, say five or six drachms of aloes, but not if there is any other trouble with the bowels. Sponging the nostrils may do good, according to the season of the year—cold water in the summer. Hot is sometimes used, but is not good, as it tends to encourage the exudation of the blood. Local remedies are of but little benefit, for the disease comes from an improper condition of the blood. Support the system by nutritive diet; watch the case closely, and see that the animal does not get too much to eat, as it might produce colic. If the pulse is not very quick and no tendency to lung disease, I think exercise is of benefit. It is a good practice to move the animal away from the stable where he has been kept. You may have to perform tracheotomy if the animal is likely to suffocate, but in most cases, although you afford temporary relief, the animal will not get along very well.

After-treatment.—Chlorate of potash and tonics, good food, regular exercise, etc, and if the flies attack him, use carbolic acid, just to prevent the flies from attacking him. It is liable to very sudden changes. You may think he is doing very well, and the next time you see him he will be very bad. You may use some styptic, as acetate of lead, etc. It is not best to open up with a knife, but in exceptional cases it may be necessary.

Strangles.—This is a very common disease among Canadian and American horses. It is called strangles from a peculiar suffocating breathing, and is known as strangles in most of our works. It is an eruptive fever peculiar to the horse, and generally attacks him when young, from two to four or six years old, but may be found in older horses. Some call it a catarrhal disease. It shows itself by affecting the organs of respiration more or less, and the formation of a tumor in the submaxillary space. It is hard and small at first, but gradually enlarges and suppurates. This tumor may form in other parts of the body, on the point of the shoulder, in the groin, etc., and when it takes on this form it is called irregular strangles. Most horses have it while young, but some escape it. Some say it is contagious, others say it is not, but many animals in the same stable become affected at the same time. However, the same influence acts upon each of them. I could not give my opinion as to whether it is contagious or not. Some say it can be produced by inoculation, but there is still not conclusive evidence. It is said to attack the same animal but once, but there are are some cases that show that it may be taken a second time. It may and does occur at any season of the year, but is more likely to be prevalent in the spring and summer, and is likely to attack those animals that have been running out during the winter. Dentition has also been said to have something to do with it, but some do not have it, so it is not sure to attack them during dentition.

Symptoms are very often similar to catarrh. The animal is dull and languid, and a small amount of work fatigues him. The attack is not very sudden; by and by there is a swelling; the animal keeps his head in a peculiar position; saliva issues from the mouth; the pulse is slightly affected, which you can detect by close examination. The bowels costive, coat staring, and it is hard to tell at this stage whether it is strangles or laryngitis, but it will soon show itself by a

tumor in the submaxillary space. It may interfere with respiration; the tumor will break and discharge, or you may disperse it by absorption, but it is better to allow it to discharge externally. The tumor may be the first thing that makes its appearance, but you have more or less fever, even if it is not noticed. There is generally a considerable discharge of matter from the nostrils, and there may be symptoms of suffocation. These symptoms may not be in proportion to the size of the tumor, but if affected with strangles and influenza at the same time, there will be severe symptoms of suffocation, and death may result. It usually runs its course in from six to twelve days, and in about twenty days the horse usually resumes his work. Some continue their work during the attack, but it is not best. You may have these symptoms, except the tumor in the throat, and by and by a swelling will appear on the shoulder or in the groin, and there may be a discharge from the nose. The tumor is generally the result of the fever; if this tumor forms upon the shoulder close to the trachea, it must be carefully watched, for it may burst internally, and cause death. In some cases the horse becomes greatly emaciated; becomes a mere skeleton, so to speak. Tumors may be in the thoracic or abdominal cavity, producing slight abdominal pain or colicky pain, and such cases generally terminate fatally.

Treatment.—It is generally extremely satisfactory to treat. The disease should be allowed to run its course. It must not be checked, for that would be attended with great danger. Give pure air, and clothe the body according to the season of the year. Give good food, such as is easily digested—boiled food, if it will be taken, but if not, then give the ordinary food. It is a disease that does not require any great amount of medicine. In the first stages, give a few doses of febrifuge medicine, chlorate or nitrate of potash, but not so freely as in ininfluenza, as there is danger of acting too freely on the kidneys. Good feeding hastens the formation of the abscess. If the breathing is not much affected, it is not necessary to apply any external treatment. In some cases it is necessary to use a mild external application or counter-irritant, but if it is a pure case of strangles, the pulse not very high, use a mild camphorated liniment. In connection with the above treatment, and if in the summer time, use a poultice, and if there are no violent symptoms, allow the abscess to form pretty well, and do not open too soon. After you have opened the abscess, give tonics and bathe the abscess with tepid water. You will sometimes meet with a more serious case, in which the animal is breathing hard and the abscess does not form soon enough. In such a case blister, and then use poultices. In winter, treat with hot wool, just to keep the parts well warmed. You will find benefit from judicious steaming with hot water, but I warn you against using a close nose-bag, for you are in danger of suffocating the animal; but keep up fomentation for some time, for even four or five hours. It may be necessary in this case to open the abscess much sooner than in the former case. Another relief is tracheotomy. Put the tube in, and allow the animal to breathe through the tube. It is not a very difficult operation in most cases, but if in a very large horse, or one that is badly swollen, you may have to make an incision two or three inches long; but it is not necessary to make a round hole. Be careful and do not push the cartilage in when inserting the tube; or, you may not have a tube at hand, and you may just cut a hole through the trachea and keep the muscles back; or just cut a circular piece out, which will give tempo-

rary relief. The treatment after tracheotomy would be just the same to bring on suppuration. After some twenty-four hours, take out the tube, wash it, and again insert it. When done with the tube, just bring the sides of the wound together, and put a stitch through it, and it will heal very well as a general thing; but this operation should be performed before the system becomes too much vitiated. The character of the breathing and of the circulation, also, is to be noticed, and be careful in performing this in a very valuable animal.

Results of strangles, or absoption of pus, pyaemia, or abscesses forming in many parts of the body. This may take place in connection with a wound, just the same as in strangles. It is purulent deposits in any part of the body. The tumor may extend up to the ear, or down even to the leg. If it is in close connection with the parotid duct, be very careful, for you might produce fistula of the duct. Keep the animal away from cows; give pure air. There is no specific for strangles. It is sometimes necessary to give a light laxative, which is the exception and not the rule; but it is necessary in most cases to give injections. It is seen more in some countries than in others. It is not seen so much in well-bred horses as in ill-bred horses. The Arabian horses are especially exempt from this disease.

DISEASES OF THE SKIN.

The skin is a dense, white, porous, sensitive membrane. The skin and mucous membranes are much alike. The skin protects the flesh from noxious vapors and external injury. There are two layers of the skin, an external and an internal. The internal is extremely tough, sensitive and vascular; and there is a cuticle, or scarf skin, which is formed on the surface of the true skin. Dandruff is simply cells of the skin thrown off.

The skin varies much in thickness on different parts of the body, and on different animals; and in applying counter irritation you must be careful. The appendages of the skin are the sebaceous and sudoriferous glands. In the lower animals the body is covered with hair, varying as to climate, season, etc. There are two kinds of hair—the mane and tail, and that known as the coat, or that which covers the body. Each hair is planted in a cavity called a hair follick. Each hair is divided into a shaft, point, and root. The sebaceous glands are small, and are lodged in the true skin, and secrete a fluid which lubricates the skin, and keeps it and the hair in good condition. These glands are very numerous, especially about the fetlock, heel, hock, etc. The secretion of these glands is of an oily character; they are called sweat glands, through which impurities are carried from the body. They are in the true layer of the skin. One square inch covers about two thousand of these pores. Their secretion passes off as either sensible or insensible perspiration, which is very free in the horse and in man.

The dermis consists of two layers—the deep or true corium, and an upper or papillary layer. The tactile corpuscles are elevations on the corium. The rete mucosum is the deep, soft layer of the epidermis.

Diseases of the skin are not so common in the horse as in man, which is owing to the mode of living. Manges have been supposed to be very frequent. There are different classifications, some according to the cause, and others according to the kind. We may have inflammations of various kinds attacking the skin. They are generally confined to the outer layer of the true skin. These are erythema or redness. Eczema means to boil, or ooze out, accompanied with exudation of liquor sanguineous. We have inflammation, followed by a form of grease, or cracked heels. At first, it is just an eczemetous disease.

Scratches, cracked heels, cracks in the hollow of the heel, is very common among Canadian horses. The irritation is at first set up in the superficial layer of the skin, and if permitted to run on it will involve the deep layers of the skin. The attack is more confined to the hind legs in some classes of horses than others, and some breeds of horses are more susceptible than others.

Causes.—Washing, and not drying; allowing them to dry by evaporation; the glands become injured, and irritation is set up; standing in badly-kept stables, or it may come from wearing a boot that is too tight. Some animals are more subject to it than others. In race horses it generally proceeds from sweat passing down the legs, which sets up an irritation. Trainers are very careful in bandaging the legs, but not the heels. Severe exertion helps the development of the disease. The heavier breed of horses are more liable to this disease than the lighter breeds. It is rare that it is met with in cavalry horses or artillery horses, for the person in charge of a horse affected is generally put under arrest.

Symptoms.—There is more or less difficulty and swelling about the heels. The animal may be stiff and sore when coming from the stable, but gets better after some exercise, and in some cases the animal may lift the leg like a string-halt, or something similar. The fetlock is somewhat swollen; blood may ooze out, in some cases, quite freely, and if in a white leg you can see the exudation. It may terminate in grease.

Treatment.—If an ordinary case in the hind legs, give six, eight or ten drachms of aloes, having prepared the animal for it by feeding on bran mash, etc. Bathe with good warm water, and if there is much dirt upon the heels, wash them well and bathe judiciously with tepid water. If there is much pain, use a light poultice; a tonic poultice is best; about two tablespoonsful of linseed meal is enough; just to allay the irritation. There are many other applications, as the white lotion, one ounce of lead acetate, six drachms sulphate of zinc, to a quart of water; or carbolic acid, one drachm, spirits of wine, one drachm, to one pint of water, if just an ordinary case. In severe cases the treatment is somewhat the same, but after poulticing just apply cotton to the heel to give slight pressure. These cracks may become of an indurated character; in such a case you will have to use a stimulant. Use iodine liniment. You may touch the parts with nitrate of silver, and you may need to give a diuretic. Nitrate of potash, two or three drachms, and rosin, two or three drachms, may be given every day for two or three days. Glycerine is useful; also sweet spirits of nitre, acetate of lead, and glycerine does very well. It is easily treated if properly treated, but do not apply a stim-

ulant unless it becomes indolent. If hot medicines are used it may produce

Mud Fever.—A superficial inflammation of the leg; it attacks any leg, mud being the exciting cause, as wet, muddy roads. It is accelerated by washing the limbs and not drying them properly, which irritates the parts and may be the producing cause, and may produce it very quickly. Being muddy during the day and freezing at night is a prolific cause.

Symptoms.—The legs are swelled, the horse is stiff, the hair comes off the legs pretty easily, the legs are extremely hot and tender, and if the cause is kept up, there may be a serious affection. The secretions are generally affected.

Treatment.—Keep the legs as dry as possible. Use a mild stimulant, and it is best generally to give a slight laxative. A cooling diet is of benefit, such as carrots, bran mashes, etc., followed by diuretics. If the limb is much swollen, you may find benefit from bathing nicely and then drying carefully. Do not rub severely. It is generally best to take the shoes off, and after convalescence begins, some gentle exercise will be of benefit. Abscesses may form right up in the groin, from the severe irritation. In England it is usually found in hunting horses, from running through the muddy fields. It is superficial, attacking the superficial layer of the sensitive skin. You may use sulphate of iron, sulphate of zinc, acetate of lead, etc. You may use an ointment of the sulphate of zinc, but it is generally more beneficially treated with lotions—carbolic acid, one part to twenty or forty of water, and if one does not succeed, try some other. Treat about as you would a case of cracked hands.

Grease.—This disease is the result of scratches, and is more liable to attack heavy horses than light ones. It is a diseased state of the skin, inflammation of the true skin, the sebaceous glands and the appendages of the true skin. It is not so common on this continent as in England and Scotland, from being a dry climate.

Pathology.—First erythematous and then eczematous. It is not contagious, nor the result of parasitic influence, but is due to some irritation which acts upon the skin. The papilla becomes enlarged, and there is a fungoid growth. This is called the grapy stage, from its resemblance to a bunch of grapes; and this comes as the last stage of the disease. There are various stages of the disease, and may give rise to pus or pustules. There is an offensive odor in the grapy stage.

Causes are predisposing and exciting. Coarse-bred horses are more liable to this than well-bred; round legs are more liable than flat ones. The hind limbs are more liable, from the less rapid circulation. Exciting causes, sudden changes in temperature; washing and not drying the limbs; standing in filthy stables, which gives another cause for it, appearing oftener in the hind legs than fore ones; high feeding and want of exercise in young animals, in order to have them early developed; a blister improperly applied. The heel, just under the fetlock, should not be blistered. It may result from getting the foot over the halter-strap, etc. Any irritation will produce it.

Symptoms.—At first a slight swelling of the limbs. After some time there is redness of the heels, which can be noticed in a white-skinned

animal. The hair stands out prominently at an early stage; a slight discharge of a kind of oily, greasy matter; hence its name, "grease." The parts become hot and tender. The animal may be almost lame; not just lame, but walking rather stiff; fissures appear in the heels, and sometimes extend right up to the fetlock.

Treatment.—I may say, when it assumes a certain stage, say the grapy stage, or even not so bad as that, it is difficult to effect a perfect cure, but it can be relieved to a certain extent. If you treat a horse for this, especially if a plethoric animal, give a pretty good purgative. After preparing him for it by giving bran mashes, etc., give six, eight or ten drachms of aloes. A light horse will not require so much as a heavy horse. It is a mistake to use powerful remedies without giving a purgative. Clipping a horse may produce grease; but if the hair stands out very much, you may have to clip the hair off; and to do away with the offensive odor, apply a poultice, with some carbolic acid. Use acetate of lead as a lotion, or chloride of zinc, two scruples to a pint of water. There are other ointments as well as this; they are more for lubricating the parts.

After-treatment.—Use applications of tow or cotton to the parts. Judicious pressure may arrest or even prevent granulations. You may use charcoal or yeast to allay the offensive odor of the discharge. You must give good constitutional treatment with the local, and you may have to act upon the bowels, although the animal is considerably reduced, but not so severely as in a sthemic animal. Use Fowler's solution of arsenic as a tonic. After the irritation is allayed, if the swelling still remains, you will find benefit from turning the animal upon pasture. Judicious bandaging, if not too tight, for the leg might swell during the night, and so do more harm than good. If you have the grapy stage you may have to use the knife, or even a hot iron, or caustics, as nitrate of silver, sulphate of copper, etc. In some cases you may apply a high-heeled shoe to raise the heel, but it is generally best to remove the shoes. Keep the parts clean, but do not wash too much. Sulphur is recommended by Professor Williams: sulphur one ounce, carbonate of soda four ounces, carbolic acid two drachms, with olive oil and lard, of each sixteen ounces.

Simple Eczema.—Is often mistaken for mange, but it is not due to a parasite, and is not contagious. It is an eruption of the minute vesicles, and is more common in hot weather.

Pathology.—It is due to some change in the blood, causing little eruptions on the skin. Little vesicles appear in the skin, which contain fluid, and give rise to an irritation. It is more likely to attack those animals that are highly fed, especially upon Indian corn. Barley and wheat are likely to produce it. You will notice it in horses at pasture, not very frequently in the spring, when the pasture is pure, but in the months of July and August, when the pasture is poor.

Symptoms.—Slight dryness about the head, ears, tail, etc., then these little vesicles can be seen, which may burst and discharge, or the contents may be absorbed. The animal rubs himself against the stall, manger, etc., until the parts are very sore, or if at work, after taking him from the harness and putting him into the stable, he will rub himself violently. The parts most affected are the head, neck,

tail, back, etc. The shoulder may become irritated from the collar; the skin dry and dusty. It is necessary to examine very closely with the naked eye, or under the microscope, and if parasites are found, it is mange, and not simple eczema.

Treatment.—Eczema is difficult to treat. You can allay the irritation, but it is difficult to effect an entire cure, and the animal is more liable to another attack each successive summer. First allay the local irritation as quickly as possible, which can be done both by internal and local remedies. Corrosive sublimate two drachms, spirits of wine four drachms, water one pint; rub well into the parts, and as well as doing this it is advisable to give internal remedies. Give iodide of potassium or nitrate of potash; or give hyposulphite of soda one-half ounce, once or twice a day until two or three doses have been taken; and use, locally, carbolic acid one part to sixteen of water, and if these do not do, try aconite one to four drachms, prussic or hydrocyanic acid one part to twelve or fifteen parts of water, applied locally. Another is turpentine; it acts upon the skin homeopathically. Use turpentine and sulphur; they will increase the irritation where applied, but will soon produce a beneficial result. Clipping the hair nicely will do good. Finley Dun gives, as his favorite treatment, a compound tincture of iodine, made by shaking together two parts iodine and one part of iodide of potassium, with six to eight parts of water. Williams gives, as an alterative, arsenic of potash; take arsenious acid one drachm, carbonate of potash one drachm, water twelve ounces; mix and boil slowly until the arsenic is dissolved, and strain when cold, and give from one-half ounce to one ounce of the liquor two or three times a day.

Sallenders.—This is a kind of squamous inflammation of the skin. It is an eczemous disease. Occurring upon the hock, it may cause falling off of the hair. In some cases irritation is set up from some cause or other, and an aqueous discharge takes place. The irritation ceases to a certain extent, and you have a thickened condition of the skin. This disease is more common in heavy draft horses, especially if highly fed, as stallions which are allowed to run down in winter, and then suddenly fed up in the spring. This has a tendency to produce it; or it may come from the flies irritating some sore upon the parts. Although not a serious disease, it is difficult to treat. Blistering may produce a well marked case.

Treatment must be both local and constitutional, and if the owner must work the horse, you may relieve the irritation by washing once or twice, but do not wash every day, just once or twice, and dress with an alkaline soda solution; after which you will find benefit from using the remedies already mentioned, or you may use an anodyne ointment. Give a purgative, or, if you cannot do this, on account of working, etc., just stint in his allowance of food to a certain extent; give diuretics pretty freely. Proud flesh or granulations may come from flies, etc. In such a case you can use nitrate of silver or butter of antimony, and endeavor to protect the hock as well as possible from the flies. If you can apply a poultice to the hock, do so A lotion of corrosive sublimate is very good. Corrosive sublimate, two drachms; alcohol, four ounces; water, one pint. It requires careful treatment and it is difficult to effect a cure, especially if the horse is highly fed. There is no specific for it.

Mallenders is just the same condition of the limb, but attacks the fore-limb on the knee, and is treated just the same way. It may come from getting the foot over the halter.

Eczema Rubrum.—In dogs it is not contagious. It is similar to eczema in the horse, the result of too high feeding or want of exercise. It comes in hunting dogs, from working in the long, wet, rough grass.

Symptoms are well marked. He suffers severely, and rubs himself very much. If you examine closely, there will be no parasites. It comes along the belly, shoulders, etc.

Treatment.—Give a laxative; buckthorn syrup, one, two or three ounces, according to the size of the dog, is very useful, but be careful in using carbolic acid on dogs, for it will be absorbed, and in many cases poison the dog. However, it is most useful. A small quantity will destroy a dog, by acting upon the nervous system. Change the food, and if he has been allowed too much animal food, change to a bread diet.

Nettle Rash.—The name is taken, perhaps, from human pathology. Surfeit is another name applied to it, coming from the belief that it comes from faulty feeding; urticaria is a name applied in many of our works. It is very frequent, and may occur at any season of the year, but most frequently in the spring, and comes very quickly. It consists of elastic pimples of various sizes and shapes coming upon the shoulder, head, neck and body, and in many cases they disappear as quickly as they came; but they may remain, and their fluid be absorbed. The pimples may come almost over the body. It generally comes from some faulty digestion, faulty feeding, etc. It may follow laminitis. Another cause is checking the perspiration when the animal is warm from exertion. It may be caused by drinking cold water when in a heated condition. Over-ripe food has a tendency to produce it.

Treatment.—Give a moderate dose of purgative in most cases, for as soon as the purgative acts, the pimples will disappear. Give diuretics—sweet spirits of nitre, one or two ounces, and in some cases it is necessary to continue diuretics for some time. You may give nitrate of potash, one or two drachms; camphor, one or two drachms, and oil of juniper, one or two drachms; or you may give colchium with iodide of potassium. You may occasionally meet with affections about the lips, called

Prusta Labialis.—It, also, is due to faulty digestion. The same causes may produce it that produce surfeit, or it may be the result of a local irritation. Grazing upon pasture where there is rough, coarse grass; or poisonous weeds may produce it. It is hard to tell the exact cause. Buckwheat is a very dangerous food for the horse, and may produce this disease. It is generally overcome by some of the remedies mentioned.

Puritis.—Inflammation of the true skin, generally seen about the root of the tail, and under the mane, but there is no particular change in the appearance of the skin. It may be the result of improper grooming, but generally from improper food. This appearance may be symptomatic of worms, but it is not generally the case.

Treatment.—It is generally best treated by corrosive sublimate lotion. Before applying the lotion, wash well and dry well. Any of the lotions mentioned are of benefit, allow a moderate amount of food, or you may give a laxative diet.

Warts.—Abnormal growths, warts, are a thickening of the cuticle; a hypertrophid condition of the superficial layer of the true skin. They are common among horses and cattle. They are sometimes called angle berries. They may appear upon any part of the body, but in horses are most common upon the head, neck, groin, flank and sheath, and may come upon the eyelids or about the lips. They vary greatly in size and shape. They may have a neck or may have a broad base. If they have a neck, they are easily got rid of; you can cord them.

Causes —It is difficult to say what is the cause. A stimulating diet, continued for a long time, may produce them. The body may be literally covered with them. They may be encysted.

Treatment depends upon the size and shape. The best way is to cut them out with a knife or scissors. The ligature is an old way to get rid of them. Just tie a thread around them, or you may find one that is pretty vascular, and you may need to use an ecraseur. Warts may come from grease. Such cases are best treated by cutting them down closely (for it is difficult to dissect them out) until it begins to bleed freely, and if it grows again, use a caustic, stick potash, but do not use the caustic at the time of cutting, but perhaps in twenty-four hours afterward; and you may have to apply a poultice to reduce the irritation set up by the caustic, and it is possible you will have to repeat the caustic in three or four days. Arsenic is used, but it should be used carefully. If the wart is encysted, then use a knife; just cut a hole through the skin and take it out, but if the animal is very badly affected, turning out to pasture for about a year may so change the system as to remove the warts. Pimples upon the shoulder and back will discharge a little matter, and may set up an irritation and produce a sitfast.

Stomatitis Contagiosa.—This comes from faulty digestion, and is not due to parasites. Small eruptions appear about the mouth and lips. Use carbolic acid and corrosive sublimate.

Mange, Scabies—Is an eruption on the skin, due to parasites. It appears in the horse, ox, sheep, dog and human being. It is more or less troublesome to all classes of animals, both domestic and wild. It may be defined to be an eruptive cutaneous disease common to a large number of animals and to mankind, and transmissible from species to species, more or less. These parasites, which we find infesting various animals, belong to the class arachnida, the order acarida, and the family sarcoptes. There are different kinds, varying in size and shape. Some burrow under the skin, and others just hold on to the skin; some can be conveyed from horse to man, and vice versa. I will just give you a little notice of the various kinds. There are three kinds—sarcoptes, dermatodectes and symbiotes. The first is common to man, the horse, pig, dog and cattle; they burrow in the flesh. The second prick the skin, but do not burrow, and are common to horse, ox and sheep. The third live in families, and set up extensive irritation, but do not burrow into the skin. It is some

time before they extend over any great amount of territory. They are common to the horse, ox and elephant. Sarcoptes means to conceal in the flesh; dematodectes to prick the skin; and symbiotes to live in families. The exciting cause of mange is parasite, and there are certain conditions which favor its development. An attack of the sarcoptes is rather slow at first, but after a time it spreads very rapidly. It will set up irritation in the skin of the human being, but will not propagate. The second is most commonly met with in the horse; it is larger and more easily detected than other parasites, and is less serious. The third is supposed to live only on the horse, but it is found on the ox and elephant.

Mange in Horses is an eruptive contagious disease, due to parasites. The exciting cause is a cutaneous parasite; but there are other causes which tend to favor their production. Animals in poor condition, with long, dirty hair, etc., are more liable to be attacked than others; but horses in good condition will be attacked. They are more extensively seen during war. It may be communicated in various ways, by harness, saddles, bridles, brushes, etc.

Symptoms.—These parasites burrow and set up irritation, and minute vesicles will be formed. Some burrow deeply, and the hair will pull off easily. It is evinced by itchiness. It is more likely to be about the tail or other such parts. In eczema, there are symptoms similar, but it spreads more quickly, and sets up more irritation and inflammation than in mange; and if you have any doubt, you must resort to a microscope. Just place some of the scales upon a piece of paper, and you may detect them with the naked eye, or you may try experiments upon your arm. Put some of the scales on your arm, and if it is mange it will, after some time, set up an irritation. It is not a very frequent disease among Canadian or American horses.

Treatment is somewhat difficult. Apply something that will destroy the insects. The treatment is generally local, but constitutional treatment may be necessary. The best is carbolic acid and lotion; an ounce of acid to a pint of water. I would recommend, after a careful examination, to clip the horse, as being a good practice in many cases, especially in summer; wash the parts well, and then use the acid. You must be careful in using carbolic acid, especially on dogs, for it becomes absorbed, and kills by poisoning. Mercurial ointment, used with caution, is good. Equal parts of oil of tar, sulphur and linseed oil is also recommended, but makes the animal very dirty. Iodide of sulphur, rubbed upon the parts, is another. Every practitioner has his favorite remedies. Creosote, one part to thirty parts of oil; or, wood tar, half pound, soft soap, one pound, dissolved in warm water If you try one, and it does not do, then try some other. In bad cases, change remedies every few days. Give easily digested and nutritive food, and if the animal is in poor condition, give arsenic two grains, sulphate of iron two drachms. Keep the pores of the skin in proper condition, which hastens the destruction of the parasites. Thoroughly cleanse the harness, clothes, saddles, etc., and use carbolic acid upon them.

Mange in Cattle.—The symptoms are just the same as in the horse. Dermatodectes is the kind generally found in cattle. You can apply stronger and dirtier remedies in cattle than in horses. Sulphuret of potassium, one ounce to ten ounces of water, once or

twice a day, or oil of tar, turpentine and train oil, but it will make the animal very dirty. It will never do to cover any great surface of the skin with mercurial ointment at one time, for it would be absorbed, but use it on one part of the body one day and another part the next.

Scab in Sheep.—Is a very serious affection in some countries, but not in Canada or the United States. The usual parasites are the dermatodectes.

Symptoms are very well marked. Extreme itchiness; the animals will rub themselves upon any hard object; the wool does not fall off from the rubbing, but from the irritation of the skin. It extends over a great extent of the skin, which takes away the animal's flesh.

Treatment.—Carbolic acid is the best thing to use. In Australia it prevailed to a large extent, and there were men appointed to experiment, and a great many remedies tried, and carbolic acid proved the most effectual. An ounce of creosote, dissolved in fifteen ounces of spirits of wine, and sufficiently diluted with water, or an infusion of tobacco; one pint of oil of turpentine, one pound soft soap, one quart water; or one ounce each of white hellebore and tobacco, to one pint of water. To prevent the spread of the disease cleanse the pen thoroughly, and do not put sheep in an infected pen for a considerable length of time.

Mange in Dogs —The parasites are generally the sarcoptes.

Symptoms are generally very plain. There are certain exciting causes, high feeding, dirt, etc. It usually attacks the back, about the lumbar vertebra, and extends to the head and neck, spreading quickly. Eczema usually attacks the belly, etc, while this attacks the back.

Treatment.—Carbolic acid; a mercurial ointment. Clip the hair nicely, and apply the remedy. I have applied carbolic acid as strong as one to eight. Do not apply either carbolic acid or blue ointment over much surface at once. You may use general remedies, purgative, etc. Cats may be attacked, and the same treatment is used.

PARASITIC DISEASES.

Ring-Worm—Is caused by a parasite derived from a vegetable, and consists in a parasitic growth of organized cells. It attacks all animals, either in poor or in good condition. The parasites come in contact with the skin in many ways, and burrow pretty deeply, and generally affect the state of the hair, and appear upon any part of the body, but especially upon the head and neck. They work in rings, hence the name ring worm. The coat is staring, and if the disease is not checked, it will extend almost all over the body, and may produce death. Ordinary ring-worms are communicable among men one to another, and from the horse to man. If we make a close examination we find a brownish elevation in the patches. The symptoms are the same as in cattle, but the patches may have larger elevations. These parasites are embedded about the roots of the hair.

Treatment.—Iodine and iodide of potassium, one drachm each to one ounce of lard. Wash well before applying the ointment; or you may use carbolic acid; touch the elevations with a pencil of nitrate silver, especially in cattle. Give constitutional treatment, especially if the animal is in poor condition. It is more easily treated in cattle and horses than in man. In

Irritation of the skin, the result of lousiness, both in cattle and horses. There is a dirty appearance of the coat. Improper grooming, feeding, etc., may cause it. Horses in good condition or upon pasture seldom have it. It is easily detected. It sets up much irritation, preventing the animal from thriving.

Treatment.—The animal affected should be separated from others. Put him in a clean box; have him well washed with soap and water; use carbolic acid, mercurial ointment; just putttng small patches upon certain parts will do; just about the head, neck, tail, etc. Use Stavesacre seed, one ounce; white hellebore, one ounce; put into one gallon of water and boil to one quart. You will find great benefit from clipping the horse, if in the spring of the year, and the coat is long.

Poultry Lousiness, which appears to be an eczematic condition of the skin. There is considerable irritation, greater than from horse lice. The animal sometimes rubs himself to a great extent. Make a close examination and you will notice lice, which are much smaller than horse lice. They may appear at all seasons of the year.

Treatment.—Remove the cause; take the horse from affected stables. You may clip the hair, especially if in the spring. You may sometimes clip him all over. This is a very common affection. I inquire where the animal has been standing; if in close proximity to poultry, remove the cause, and then treat as for other lice. There is sometimes considerable irritation set up by maggots. They are the larvæ of the blue fly, and sometimes attack horses' ears in the United States Treat by cleansing the parts well; then use carbolic acid lotion, and keep up the application for sometime; tincture of benzoin, and oil of tar, turpentine and linseed oil, etc. Cover and keep the flies away from him. Ticks are also very annoying to some animals, especially sheep. Brush thoroughly, and use any of the applications I have given you. There are certain flies that are troublesome at certain times of the year, and are more troublesome some years than others; not so troublesome to horses as cattle. Some years ago they set up such an irritation that it was thought to be some disease. They are most troublesome in August or September. The animals will run into the water and then out; and this, together with the irritation set up by the flies, will make them be one swollen mass, from both congestion and irritation. The flies present much the same appearance as the house flies, but differ from them in having a sharp proboscis.

Remedies.—It is good practice to recommend cattle to be kept in during the day and allowed to run out at night. Equal parts of oil of tar, benzoin and linseed oil, carbolic acid lotion, are very nice in such cases.

Warbles in Cattle.—Having them in a horse is a mistake. This is produced by a fly, which deposits an egg through the skin. The puncture irritates to some extent; this egg hatches, grows to a

certain extent, and produces an elevation called grub in the skin. They are more likely to attack an animal of thin skin. Fine bred cattle are more liable to this than the opposite. The animal rubs and scratches himself; after a time the grub comes out, or you may cut it out, or puncture with a hot wire; but it is better to use a lancet and take it out.

NERVOUS SYSTEM.

The nervous system consists of a central portion, the cerebro-spinal axis, emanating from which there are a number of white glistening cords, called nerves. The center or axis is divided into two portions, one large and expanded, called encephalon, or brain. The other is elongated in form, and is known as the spine or spinal cord. There are nerves leaving this system, and are distributed to those parts of the body under control of the will; these are called nerves of animal life; they go to the muscles. There are two chains of nervous ganglia, which extend along the vertebral column. The nerves emanating from these are called nerves of organic life, and are distributed to the viscera, lungs, heart, glands, and blood vessels. Some parts are under the control of both these nerves. In the formation of nerves we have two elementary structures: nerve cells and nerve fibres; the white and the gray matter. Ganglionic corpuscles are found in the nerve centers, and in the extreme end organs of some of the nerves they are capable of generating nerve force. They convey impressions to and from the brain. The coverings of the brain and cerebro-spinal cord are the dura-mater or outer, arachnoid or middle, and pia-mater or the inner. The processes given off in the brain are, the falx cerebri, tentorium cerebelli. The central covering, the arachnoid, belongs to the serous class of membranes, and, like all such membranes, presents two coverings, the parietal and visceral. The pia-mater is formed of minute blood vessels, held together by areolar tissue. The dura-mater is attached to the cranial cavity, but is not so attached in the spine. The brain proper is divided into four parts: the cerebrum, cerebellum, pons varoli, and medulla oblongata. The cerebrum is divided into two hemispheres by a longitudinal fissure, in which the falx cerebri is lodged. The medulla oblongata is a continuation of the brain. The nerves which pass from the brain are cranial nerves. There are twelve or nine pairs; we generally take it at twelve. They are:

First, Olfactory, or nerve of the special sense of smell.

Second, Optic, or nerve of the special sense of sight, which presents no sensibility. These fibres start in two roots. Some pass from the right side to the left bulb, and vice versa; and some pass straight on to the eye of the same side; and some cross from one side to the other, and do not go to the eye.

Third, Motores Oculorum, is a motor nerve; it gives a part to each eye; it is distributed to all the muscles of the eyeball except external straight and superior oblique.

Fourth, Pathetic; motor to the eye and superior oblique.

Fifth, Trifacial mixed, common and special, sensation and motor;

it is a large nerve and divides into three branches, the superior and inferior maxillary, and the opthalmic.

Sixth, Abducens; motor to the abdutor muscles of the eye. If this muscle was paralyzed, the eye would be turned inward.

Seventh, Facial motor; great motor of the muscles of the face, but does not supply the muscles of mastication.

Eighth, Auditory; the special sense of hearing.

Ninth, Glosso-pharangeal; mixed, sensory and motor; goes to the tongue and pharynx.

Tenth, Pneumogastric; goes to the stomach, lungs, pharynx, larynx, and trachea. It is a mixed nerve, but is highly important.

Eleventh, The spinal accessory; mixed.

Twelfth, Hypoglossal; goes to the tongue. It is motor.

DISEASES OF THE NERVOUS SYSTEM.

Such diseases are not so numerous as in the human being, but we have well marked nervous diseases in the horse, and sometimes they do not give well marked symptoms. The brain has certain coverings, which are closely related with the brain. The one being diseased, involves the other.

Cerebritis, Encephalitis.—It is known by another name, which does not explain the pathology, but explains the symptoms. It is phrenitis; the disease causes phrenzy. It is not a very common affection, for you may have a severe affection of the brain without phrenitis. It is generally congestion, and then inflammation acting directly or indirectly upon the brain. There may be a formation of matter or abscesses. Phrenitis may come from various causes—injury to the skull; concussion of the skull; concussion of the brain, with or without fracture of the skull; continued exposure to the heat; from high condition; from affections of the digestive organs; or you may have a pure case from causes which cannot be accounted for. A great many classes of diseases, that produce great mortality, are caused by diseases of the brain and spinal cord. It is the result of debilitating diseases, from strangles, from matter forming in the brain, tumors, abscesses, etc., causing congestion and inflammation. The brain is largely supplied with blood.

Symptoms—The premonitory symptoms are marked dullness, excessive drowiness. If an animal is standing in a stall, he will rest his head against the manger. The pupil contracted, which afterwards becomes dilated; the pulse full, and may be very low, as low as twenty beats per minute, and it afterwards becomes quick. There is a peculiar breathing; not such as is found in pneumonia, etc., but just a stentorious breathing. These symptoms are followed by general excitement and perfect phrenzy; the pulse quicker, and the breathing loud; the animal reels about the box; the head high (but in some cases this is just the reverse); will rear up, and get the feet in the manger, and stand in such a position. At other times will lie upon the side, and double the head under the breast and fore leg. Moves just like a piece of machinery at times. At other times, as if for relief, he may carry the head to one side, due to the part or parts affected. It is almost impossible to lead the animal; he will reel around and fall down. The paroxysm may pass off, and the animal will remain quiet for some time, and then have another attack.

It is likely to terminate fatally. The convulsions become more frequent and alarming. He will place his head between his fore legs, etc.

Treaiment.—It is sometimes dangerous to attempt treating it. Use the anti-phlogistic treatment. Give a good dose of purgative medicine, six to twelve, or if very heavy horse, you may give fifteen to sixteen drachms of aloes; may give aconite, or blood-letting may be of great benefit; give injections freely, but I do not recommend opiates to any great extent. But you might in some cases give chloroform, morphia, etc. Give bromide of potassium in pretty good doses. Apply cold to the head—cold water or ice. If the symptoms are not extremely violent, do not give up the case, for your labors may be crowned with success. If the pulse is tolerably strong, and the animal is not perspiring freely, there is hope. If the animal is in good condition, not too fat nor too lean, it is good practice, in some cases, to draw blood. If an animal dies from inflammation of the brain, you will find an increased amount of blood to the brain, or you may find blood in the ventricle of the brain. You combine calomel with aloes, and croton oil is sometimes recommended, but in combination with these do not give as much aloes as you would without them.

Sunstroke.—Common to all animals, more common to man than animals; common among hard-worked horses in the hot months of summer. It is a congested state of the blood vessels of the brain, with loss of sensation and of voluntary motion.

Causes.—Exposure to the hot sun, as a general thing, but there are predisposing causes, as over-stimulating diet, breathing impure air, etc Horses in good, healthy condition, with moderate exercise, regular habits, etc., are not so liable to an attack; but an animal in perfect health may be attacked.

Symptoms.—There may be premonitory symptoms before the violent symptoms; dullness; animal may have been doing work, but has been dull; appetite impaired, dryness of the skin, increased temperature of the skin; horse does not sweat readily. I have noticed this in connection with street railway horses; would show such symptoms for two, three, or even four days, before showing severe symptoms. Animal will show a staggering gait in acute symptoms; may fall, struggle for some time, and then lie quite still for some time, from complete loss of power; or he may not lose all power, may try to rise, fall and injure himself in this way; pupil dilated; pulse quick and weak, breathing stentorious; will offer no resistance when you attempt to raise him.

Treatment.—If the animal is in a semi-comastose condition, it will be difficult to give medicine; but apply cold water to the head, by means of wet cloths, or take ice and pound and put it into a bag, and place over the head. Keep the body warm, stimulate, use tepid water and turpentine, and if the animal can swallow, give stimulants; one ounce nitrous ether to two or three ounces of water. But if the power of swallowing is gone, be very careful in giving medicine by the mouth, for there is danger of it passing into the trachea. Try hypodermic injections of ether. I have tried it in cases where there was great prostration. If the animal shows signs of returning consciousness, there is hope of recovery. If he wishes to drink, give nice cold water, and if you think he can stand, help him up. Give small

doses of purgative medicine in most cases; and give bromide of potassium, and watch closely for some time, for it is sometimes very deceptive; when you think it doing well, it may terminate fatally. It may show impaired nervous influence for some time after; use bromide potassium and stimulants. Animals may be prevented from sunstroke, after premonitory symptoms, by putting off work, and using judicious preventives—stimulants, followed by a gentle laxative. But if put to work in such cases he may present a well-marked case of sunstroke. This may affect the spinal cord to a certain extent; give injections, and keep from the rays of the sun.

Concussion of the Brain is rather common. It may result from the horse running away and coming in contact with some obstacle; rearing up and falling back. It is not so common in horses as in man. The animal may rally quickly, die suddenly, or linger for some time; may have some congestion of the brain.

Symptoms.— The animal loses all power and sensibility; may have convulsions, or may lie without any signs of life, pupil dilated, pulse weak; even if the pulse is quick but regular, there is hope of recovery, but if there is a case of fracture, there is not so much hope. But if there are any signs of consciousness, and the animal attempts to get up, he will rise upon the hind legs first, and it will be some time before he can get the fore quarters up. In some cases the animal gets well quickly.

Treatment.—Similar to that of sunstroke; cold water to the head, but not in very cold weather. Covering the body, and leaving the head uncovered, may do instead of water in very cold weather. Small doses of stimulants; keep the body warm; give injections, and get him upon his feet, and you may have to use slings. You may have phrenzy present itself, and if it does, treat according to treatment of phrenzy. A horse suffering from concussion may stand with head hanging down, from impaired circulation. Hypostatic congestion is likely to follow; nostrils and head swollen, etc. In such cases, support the head well with nice wide web; or if you cannot support it, you may find it necessary to lay the horse down. Give laxative medicine; it is of great use in such cases. Bathe the limbs with warm water in all cases where the circulation of the blood is impaired. Blood-letting in such cases I do not think is to be recommended, but there may be exceptional cases.

Megrims, Epilepsy, Vertigo, Head Staggers, are morbid conditions of the brain, getting the names from the way the horse uses himself. It may proceed from a variety of causes. It may be from temporary congestion of the brain, or may result from anything that will interfere with the flow of blood. It may be symptomatic of disease of the heart. Some horses suffer from working in a collar, which would not so suffer if put under the saddle; but it generally comes from some obscure cause, as faulty digestion, but most likely just due to some morbid condition of the brain, very hard to account for, or you may find a tumor in the brain. A highly nervous animal is more subject than one of the opposite temperament.

Symptoms —Attack is sudden; the animal staggers, is unmanageable, and falls to the ground. Symptoms may pass in a few minutes, and the animal may in some cases be as well as ever. But such a horse is a very dangerous animal to handle, for he may fall or

become perfectly unmanageable at any time. It is due to temporary congestion of the brain, or to impaired flow of blood to the head. In some cases you have the premonitory symptoms, such as dullness, peculiar appearance of the eye, etc., while in others you do not have the symptoms. This drowsiness may not appear, but if the horse has been subject to it, this will very likely appear.

Treatment.—It is seldom you are called to treat such a case, but if you are, dash cold water upon the head. After horse has recovered from the attack, give a purgative, followed by bromide of potassium; keep upon good food, and he may never have another attack, but if due to peculiar formation, he will likely have it again. A peculiar straight-necked horse I think more liable to it than others. Choking may be taken for megrims, from its exhibiting similar symptoms.

Preventives.—Use cold to the head, keeping it cool; some use shade over head in very hot weather. Cerebral tumor may produce it.

Cerebral Tumors.—These may be found in connection with the choroid plexus. They may be due to a tubercular tendency in the ox, but not in the horse. Hard work may produce them, and a very nervous temperament may have a tendency to produce them. They may cause various symptoms, such as megrims, inflammation of the brain, etc. They may attain great size, and then interfere with the function of the brain. Nothing can be done for such tumors. You may relieve the symptoms of the nervous system.

Thickening of the Duramater.—It is hard to tell just what may cause it, but it is most likely to come from a rheumatic tendency.

Softening of the Brain is seldom met with in the horse. It may be due to certain causes, such as slight inflammatory action, food having a narcotic action, etc., and interfering with the action of the brain, more or less cerebral disturbance, paralysis, dilated pupil, etc.

Hypertrophy of the brain and oozing of the brain has been noticed. A portion of the brain may be removed, and the animal live.

Atrophy may also be found, causing partial or complete loss of power, but there are no distinguishing symptoms by which to tell this disease.

Melanatic Deposits are also found in the brain, a deposit of a dark substance, which we find in the pigment cells, and it is more common in white horses. These tumors have been noticed in the brain and spinal cord.

Bony Tumors, or Exostosis.—Fibrous tissue develops bone, and you may have them from fibrous tissue. They have been found of considerable size in cattle without disturbing the animal, but they will in time disturb him. It is very difficult to diagnose these different cases, and say just what is the precise lesion present.

Concussion of the Spine.—I think this has been well noticed in man, and is likely to be produced by severe injury in the horse, as getting fast, running away, falling over a bank, etc. I do not mean to say that in these you have very well marked symptoms. But in a few hours after receiving the injury the animal shows difficulty in walking without the muscular system being much injured, but I be-

lieve that it is from concussion of the spine. Now if you meet with a case, and you suspect this, keep the animal quiet and give laxatives; feed upon bran; give belladonna, bromide of potassium, and if allowed a good, long rest, the animal may get well; but if not so treated inflammation comes on, which will be

Spinitis, and it may be produced in the manner which I have given you: putting to work too soon after concussion. It is sometimes due to the animal injuring the back, and producing paralysis of the hind quarters. It may be due to severe exertion, or undue nervous excitement, and entire horses are more liable to it than mares or geldings, from more nervous excitability, due to what they are used to, and it may be produced by poison being absorbed into the system.

Symptoms are not very well marked, and vary according to the severity of the attack; may not be very alarming at first, but increases in severity, and you will find intense fever; the animal suffers to a great extent, staggers in walking—may fall and have great difficulty in getting up; battering of the fetlocks, etc. I saw one case of fracture of the fetlock in trying to get up. There are such symptoms in azoturia, and I think I knew one case destroyed for spinitis that was only suffering from azoturia. It is different in stallions; quick pulse, impaired appetite; in backing, or in bringing the limbs back, there is a peculiar jerking of the tail; after which paralysis sets in. It is rare that the entire horse becomes paralyzed at once, but they often become irritable for some time, after which paralysis sets in.

Treatment.—If you suspect congestion of the spine, give a purgative and injections. Try ergot of rye, and if there is great difficulty in rising, try slings. Afterward you may use nerve stimulants, but do not use them in acute congestion of the blood vessels, but use such remedies as will counteract the supply of blood. The result of this is

Paralysis, either partial or complete; loss of sensibility or motion. It may be divided into two classes—perfect and imperfect. Perfect is where there is both loss of motion and sensibility; imperfect is loss of either without loss of the other. We may further divide it into partial and complete. If the attack is complete, death soon results. If it attacks one-half of the body longitudinally, it is called hemiplegia; this is common in the humar being. If it affects the hind quarters, it is paraplegia. Reflex paralysis is due to something acting upon and affecting the nervous system, as colic and such affections. If the spine is affected, all the parts are affected behind the seat of the injury. If injured in the cervical region, death is almost instantaneous from paralysis of respiration.

Hemiplegia generally results from injury to the brain, and is occasionally due to sun-stroke, tumors, etc.; and there are other conditions that may produce it, but these are the most likely to produce it. Nervous excitement and the use of intoxicating liquors produce it in man, concussions of the brain, etc. The animal cannot walk straight, goes in a circle; the muscles waste to some extent; you may relieve the symptoms. Use anything that would relieve congestion; afterwards use nervous stimulants. It is very slow getting well. There is not much success treating paralysis of the posterior extremeties. It may be produced in many ways in the entire horse: from spinal irritation; too much covering, which sets up inflammation of

the spine. Another cause is injury, as the horse is being cast in the stall, or thrown for operation (and it would be well to explain to the owner that there is some danger in throwing a horse); or it may be due to a severe strain, such as hunting-horses are subject to, or from slipping; or fracture of the spine, etc., and it may come from such injury where there is no misplacement.

Symptoms.—Many very plain cases have occurred by irritation of the spine, as falling into a ditch, etc., causing more or less loss of power. If the animal lies down he has great difficulty in getting up, generally, but may get up easily. In perfect paralysis, the symptoms are very plain; if the animal is down he tries to get up upon the fore feet, but there is no action in the hind limbs; may show signs of severe pain. If you draw the hind leg forward, the animal offers no resistance. The pulse runs up pretty quick. But these symptoms may show themselves in azoturia, without the spine being injured. An animal sometimes loses power, and is unable to rise, but can, in exceptional cases, move the tail for sometime after the other parts are motionless, and there may be some feeling in the tail also. If it is due to fracture, you may have the animal destroyed if it is complete; but if only partial, you may treat.

Treatment.—It is good practice to place in slings, if there is difficulty in getting up, but can still bear a certain amount of his weight upon his legs, for a horse will not live long if he does not support some of his weight upon his legs. If in the early stages, and you suspect congestion, try belladonna and ergot of rye—ergot, twelve drachms daily; atropine, two grains daily. Use belladonna internally and externally, and stimulate the loins with some mild stimulant, and do not feed very high; and when you think but little or no irritation remains, use a nerve stimulant—two to four grains of strychnine daily, or nux vomica one to two drachms, daily, also stimulate the loins with a stimulating liniment, or even blister. A newly-flayed sheep-skin has been recommended, and you will find benefit from iodide of potassium and bromide of potassium, in pretty large doses. I prefer the bromide. If the animal is in poor condition, you may feed pretty well and try tonics, but if it is a case of three or four months standing, there is but little hope of recovery. Electricity is of use in paralysis. Extremes of heat and cold have no doubt something to do with paralysis in horses, especially in stallions, but not so much as nervous excitement.

Paralysis of the Lips —Is common in the horse; may occur in any animal. The nerve is implicated. It may occur in various ways—from injury to the brain, irritating the origin of the nerve, and causing it. Such a case is generally incurable. A heavy head-stall may produce it, by interfering with the flow of blood to some extent; or pulling violently upon the bridle; injury of any sort may produce it; exciting himself in the stall; exposure to extreme cold is a common cause. The nerve is very much exposed, and cold irritates it.

Symptoms.—Hanging of the lip; in a majority of cases it is confined to one side; the other side drawn up to some extent; difficulty of prehension; in drinking he will place the mouth deep into the bucket. The lip hangs in almost one condition. Similar to purpura, but there is no swelling in paralysis. Examine closely into the case as to the head-stall, etc.

Treatment.—Remove the exciting cause and foment, especially if from exposure to cold, and use a mild stimulant, such as the camphorated liniment. If the case becomes obstinate, give laxative medicine, and follow with bromide of potassium. Although it is due to local influence, treat internally. Try the effect of a slight blister. If it is due first to irritation of the nerve, use one part of biniodide of mercury to eight of lard. If it is due to any brain trouble, there is not much hope of recovery.

Hydrocephalus, or Water in the Brain.—It is generally congenital in the lower animals, and it is rare that the animal lives for any great length of time, but human subjects do live. If much water is present, it interferes with the brain to a considerable extent.

Symptoms.—It is associated with tubercular influences. Well bred cattle especially suffer from tubercular deposits. Water accumulated perhaps in connection with the arachnoid, and although it is a fluid, it acts upon the soft sutures, which yield readily to a liquid. The head attains an enormous size in some cases. It is gradual in progression, the body emaciated to a considerable extent. We are seldom called to treat such cases, but in parturition you may be troubled with this, and you will just puncture and let the water out. It is possible for an animal to have it and live for some time, but if in a puny, sickly animal, it would be best to recommend its destruction. There may be effusion into the frontal sinuses, which you can also puncture.

Sturdy or Gid.—It is caused by the hydatid coenurus cerebralis. It is developed from the tape-worm of the dog. The eggs of the tape-worm are taken into the system of the sheep and developed, causing what is called sturdy, or gid. Experiments that have been made of those sheep that received the ovum of the taenia coenurus, showed that one-half became affected in from ten to sixty days. It consists of a body with many heads, which irritate the substance involved. It may not set up much irritation for some time.

Symptoms.—If it is but one hemisphere, the animal will go round and round, either to the right or left, depending upon the position of the disease. If it is between the lobes of the brain, the head will be carried high, perhaps; but if in the medulla oblongta, the animal can not walk very well, if at all. These pin-like heads may find the cranial bone, and cause absorption of it, and they may even come out through the skin of the parts. In such cases you can detect them through the softened condition of the bone; sometimes, but not always. We are not often called to treat such cases. They can be removed by trephining the bone, and sucking out the parasites through a camula, by means of a syringe. It may prove successful.

String-Halt.—The opposite to paralysis. So named from the action of the animal. It is entirely due to some lesion or lesions of the nervous system, but just what part of the nervous system it is difficult to tell. Some say a part of the spinal cord; others say a part of the brain, and others of the nerves supplying the hind extremities. We see animals affected with this for years, but this could not be if the brain was much affected. It is produced by some lesions or abnormal condition of the nerve going to the parts, as a general thing, but may be due to some lesion of the spinal cord. It is easily detected, as a general thing.

Symptoms.—Violent spasmodic contraction of the muscles of the limb. And of the muscles, the extensors are oftener affected than any others. The symptoms vary much. It may be so slight that you cannot notice it by moving the horse forward. The leg may be brought entirely up to the abdomen. The horse does not show it at all times; but may show it, and then go for some time, and again show it, etc. It is best seen in turning the horse around, and you may have difficulty in making up your mind whether it is a natural or unnatural condition. Push the animal back, and from side to side. There is one form that shows itself in the stable, which does not show it outside, but after standing in the stable for some time and then taken out, shows it.

Causes.—The exciting cause is hard to give, but is most likely to occur in highly nervous horses. It sometimes results from blistering for ring-bone, which may have irritated the nerves in some way. I think another cause is clipping, and exposing to the cold afterwards. The symptoms are better marked in winter than in summer. Some show it in winter that do not show it in summer at all. It is an unsoundness, and a disease. You must look out for this in your examinations for soundness. But it does not interfere with the animal for work to any great extent. It is likely to be progressive.

Treatment.—It is an incurable disease, but may be palliated by attending to the feed. Give a purgative, and you might use bromide of potassium, especially if it is suddenly developed. Put him in a comfortable place; keep him nice and warm. Another cause is irritation, caused by castration, either from irritating the nerve in throwing him, or in irritating the nerve of the testicle in such animals as showed no signs of it before.

Cerebro-Spinal Meningitis.—This disease is more extensive now than it was some years ago. It is congestion, followed by more or less inflammatory action of the coverings of the spinal cord and brain, due to a congested state of the blood vessels. This appears to be a comparatively new disease, and is found principally on this continent. It does occur in other places, but not so frequently. I am inclined to the opinion of some others, that the sympathetic system is involved and implicated to some extent, perhaps from some noxious conditions in the blood. It generally appears to the greatest extent to those that are breathing impure air and using improper food. Soldiers established in barracks are more subject. It is generally met with in horses in large cities, where they are crowded together to a great extent. Anything that is debilitating tends to produce it. It is more severe and fatal in crowded stables. Some say it attacks healthy as well as horses in poor condition. If this is so, then it is due to atmospheric influence. It is difficult to say what is the exciting cause. It may be due to atmospheric influence, local causes, vegetable poisons, grass containing narcotic properties, etc., affecting the cerebro-spinal nerves, and sympathetic as well. It appears in various forms, and the

Symptoms vary according to the parts affected. Some show the spine affected, and others the brain. Sometimes it shows itself by loss of power, especially of the posterior extremeties. The appetite is impaired, or completely gone. An animal may be in apparently good health, and in twenty-four hours will present the above symptoms. The temperature does not vary to any great extent; in some it

is increased, in others decreased. The tremors or spasms show themselves in different parts. In the early stage the pulse is not accelerated generally, but may be even slower than natural. In other cases there will be a peculiar involuntary jerking; the animal reels about, and in some severe cases falls or lies down, and is unable to rise; the bowels usually costive; urine of a brownish color, and retained in the bladder, but is not so dark as in azoturia. As well as loss of power in the posterior extremeties, you will have well marked cerebral disturbance, and a comatose state, which, in a few hours, may give way to slight delirium, which, in some cases, lasts until death closes the scene. One symptom is paralysis of the muscles of deglutition, and it will lead (especially a non-professional man) to think of acute inflammation of the larynx. I have had some difficulty in saying whether a case was meningitis or typhoid fever. I am more and more convinced every day that cattle and horses suffer from nervous diseases, and that without knowing how to account for it. It is more common in animals that are grazing in the bush, eating grass that may have become over-ripe, which acts first upon the digestive, and then upon the nervous system. The symptoms are dullness, produced in a short time; costive condition of the bowels; appetite gone; thirst intense. If you give him a pail of water, he will place his head in it, and you would think he was drinking rapidly, but you will find that nothing has been taken, for he is not able to swallow. These are prominent symptoms. He may get the water in his mouth, but cannot swallow it; but not from any soreness. The animal may show slight abdominal pain, and when he lies down he has no inclination to get up, but will lie stretched out; may move the legs. The pupil becomes dilated; the mucous membrane becomes impaired, although in the first stages they may have been infected; but after the convulsive paroxysms become more frequent, they become impaired. He may become perfectly comatose.

Post mortem.—You will not notice very well marked changes, especially to the casual observer. So you must be very careful in making examinations, especially if several become affected and die suddenly. The stomach and bowels will be empty; the blood vessels reddened; effusion in the arachnoid, and into the ventricle of the brain; also extravasation into the intestines in small spots, from the size of a pin head to the size of your finger. You may find congestion of the lungs, but it is generally hypostatic, from lying in one position. Examine the brain and spinal cord. There will be a reddened appearance of the coverings, and well marked effusion in the brain; but there may be but little of this reddened condition, and generally but little the matter with the throat. The irritation of the throat in a pure case of meningitis is generally due to some other cause, as the improper administration of, or the giving of improper medicines.

Causes.—*Atmospheric influence, or it may occur in an epizootic form, from one cause operating on all at one time; water containing a great amount of organic matter; decomposition acting upon and affecting the nervous system. I have noticed some cases which I think were caused by using water containing drainage from the stable. In some cases it affects the spine more than the brain, hence its name. I have noticed some cases, and I almost think it was influenza severely affecting the nervous system.

*See the first part of the Lecture.

Treatment.—If there is a complete loss of power, of course it is hopeless; but if taken in the earlier stages, where it is confined to the spine, it may be treated. You must treat to relieve congestion, and try to prevent the spread of the disease. Use hyposulphite of soda, and change the food. Belladonna is highly recommended, one, two, or three drachms a day, and continue for some time, or its alkaloid atropine; or give ergot of rye in two drachm doses; bromide of potassium in two or three drachm doses. Use judiciously a good stimulant—hyposulphite of soda may be tried. If there is loss of power, use slings, but not unless he can bear some of his weight upon the limbs. It is very difficult to treat a horse after he has laid for some time, as he will be covered with sores. You may give injections, to act upon the bowels, or use aloes, two to four drachms; but be careful if there is any irritation of the bowels After some time, if there is still loss of power, use nux vomica. If he is improving some, say in four or five days, take him out and allow him to walk some; try the effect of tonics. I have a tube which I can insert through the oesophagus, for the purpose of giving stimulants when there is loss of power, but have not tried it yet. Counter irritation to the lungs, stimulating liniments, hot and cold applications have been recommended, and I think may do good. Try hot and cold applications alternately. It may produce a good effect. If you think it does harm, try other treatment. This disease is sometimes called cerebro-spinal fever. There is a cause for every disease, but it is sometimes very difficult to tell just what the cause is.

Chorea.—All spasmodic twitchings may come under the head of chorea, but we may just retain the common name "string-halt." Chorea in the horse is a peculiar affection of the muscles of the hind extremeties. It causes a kind of shivering, and the horse is called a shiverer, from the trembling of the muscles. It is the result of some lesion of the nervous system, especially of the spinal cord. I do not say it is a severing of the spinal cord, or you would have paralysis. It varies in intensity and may show itself only when backing the horse. In fact, you will sometimes find a horse that you cannot back at all, which may be from indisposition, or due to chorea. If the horse walks straight along, you may see no signs; but stop him, and try to back him, and there is great difficulty. Tail raised up; muscles will jerk and shiver, etc. More common in highly nervous animals; more common in well bred horses than in coarse bred, and some breeds are more subject to it than others. Some slight injury will produce it in one predisposed to it. It is aggravated by any derangement of the digestive organs, and will show itself in just about the same way, no difference how it is produced. It is an unsoundness, but does not interfere with the animal's usefulness very much. When you examine a horse, back him pretty forcibly. If he cannot back, and the tail raises up, you may conclude such an animal is not sound. It is a progressive disease. It may supervene castration. In such a case use bromide of potassium in pretty fair doses, and then nux vomica, continued for some time. You may have loss of power for some time; or tail will jerk up; horse stands from side to side; sits or falls down, and cannot get up again. It is just another form of chorea. You may think something is the matter with the back, which might be possible, but more likely to be from the spinal cord. In such cases milanotic tumors have been found in the brain or spinal cord, which interfere with the great nerve passing to

the posterior extremities. In such a case the animal is entirely useless. May trot along quite well for some distance, but put him in the stall and excite him, and all the above symptoms will be seen. I do not think, as a general thing, that anything can be done for it. Another form is spasmodic action of the muscles of the fore extremities, and only shows itself after the animal has been driven some time and is greatly excited, when you will find well marked symptoms. Shows great lameness after driving, but if allowed to stand for some time will show it but little; drive again, and similar symptoms will take place. In dogs we find another form of chorea, in connection with distemper. Dogs may suffer from epilipsy; more likely to have epilepsy than the horse. All the muscles of the head and body may become comatose, and so lie until relieved by death.

Treatment.—Bromide of potassium, and then nux vomica. I believe there is no better remedy than bromide of potassium. In epilepsy in dogs, give porridge, etc., with small allowance of animal food. Allow some exercise and fresh air.

Convulsive Ergotism.—More frequently met with in cattle than other animals. Animals fed upon brewers' waste are more likely to have it, but it may come from other well marked causes. Nothing exerts more peculiar effect upon animals than ergot. Most marked effects upon healthy body, from long continued use, is diarrhea, external suppuration, gangrene, and dropping of the toes. Alarming symptoms have appeared from the long-continued use of rye. Again it takes on the convulsive form, which, I think, is the form met with in veterinary practice, but we may meet with both forms. Sprouted corn may produce this. I think it has been produced in this way. It affects both brain and cord. I have seen in this city some cases that might be called ergotism, produced by well marked causes. Sprouted grain produced it in the cases to which I have referred in this city. It affected the nervous system, and gave rise to well marked symptoms. If this food was acted upon by boiling water, it would destroy its bad effects.

Symptoms.—Dull, drowsy appearance, almost comatose; loss of power in hind extremeties. If you attempt to move him, or press upon his neck, he will fall upon his knees. Bowels costive, and those peculiar involuntary twitchings of the limbs, similar to poisoning with strychnine.

Post mortem appearance.—In cattle, in particular, there is a great amount of food in paunch, and but little alteration to be noticed in the true digestive system and small intestines. Increased vascularity in the coverings of the brain and cord. Now ergot may affect animals differently, as whisky affects men. If you meet with such cases, give good doses of purgative medicines, and get rid of the poison as quickly as you can. Give stimulants and hypo-sulphite of soda, from one-half ounce to one ounce. Stimulants are not of much use, but may be of benefit in some cases. Apoplexy may occur in horses, but it is rare. There is one kind in cattle, due to slight spinal irritation. Symptoms, unable to rise; in comatose condition.

Treatment.—Restrict food; give laxative, bromide of potassium, and nux vomica.

Rabies, or Hydrophobia.—Called hydrophobia from dread of water; rabies, from rabia, to rave. It is a disease essentially of the

nerves. Symptoms produced from some cause acting upon the blood and affecting the nerves. Not so frequent in this country as in more southern countries, but does occur on this continent. It is a virulent disease, and may be developed in cat and dog spontaneously, but not in other animals. It is a disease belonging to zymotic diseases.

Pathology.—It depends upon some peculiar alteration of the blood, and affecting the nervous system. There will be no particular lesions in any other part of the system. Climate does not appear to influence this disease as much as formerly supposed. It was supposed to be more likely to be produced during dog-days than at any other time, but this view is not very well established. As to the contagion of rabies, there is no doubt but it is contagious, but the poison is in a fixed form, and is not transmitted through the air, but must be by direct inoculation It is more likely to be in the saliva, but may come from any part of the body. It is said that the flesh does not contain the virus, and that the flesh on an affected animal could be eaten without danger, but it has been found that the blood does contain it, and inoculation has been produced by the blood. Others say that inoculation has been produced by the flesh. Virus is most easily taken in by one animal biting another. It is recorded that it may be taken in from skinning a dead animal, and taking the knife in the mouth, and that without cutting the mouth, the virus being taken into the system through the saliva; but the hands are not susceptible, unless there are sores on them. The power of the contagion varies to some extent. It is impaired by passing through several bodies. The most frequent mode of injection is by the teeth, and an animal having been bitten by another, even before the disease had developed itself, may become affected. The period of inoculation varies to some extent, from ten days to five or six months. This has been found from experiments. Some say that man has lived for years and then became affected, but such statements are not very reliable. Some animals are more subject to it than others, and some have been known to resist it altogether.

Symptoms in the Dog.—The animal may become excited to a great extent, and so become very dangerous. May also become dangerous if suffering from brain or nervous disease. It is said to occur in two forms. Animal does not become excited to any great extent; there is a period of dullness, followed by excitement. The violence may continue for some days, then the animal become greatly exhausted—has a tendency to lie in out-of-the-way places. May lie quietly for some time, then run about and try to bite surrounding objects; also, has depraved appetite, eating dirt, etc. This symptom would also be symptomatic of indigestion, and alone is not a significant symptom. Symptoms increase; animal evinces pain; may be extremely quiet, and may be suddenly excited; will not go much out of his way to bite anything; not like one savage dog attacks another, but just snaps and runs on. Is most furious towards one of his own species. Gives a peculiar howl; gets quiet, then symptoms occur again, etc. Great difficulty in swallowing may occur. Dogs do not have this dread of water, but may lose the power of swallowing.

Post mortem.—Make it carefully. Do not let any blood come in contact with sores. Principal changes are in the nervous system, congestion of the brain and spinal cord; skin affected to a great

extent; more or less changes in the stomach and bowels. No treatment is recommended; put out of the way as soon as possible, also those that have been bitten. It is noticed in the horse but seldom.

Symptoms in the Horse.—Shows restlessness; will bite at and rub the seat of injury, followed by more or less cerebral disturbance, and perfect phrenzy, and acts much like phrenitis; but in p' renitis the animal is not vicious. There may be paralysis either partial or complete; will bite in a peculiar way, not like a biting horse. Symptoms of cases I have seen: peculial dullness, excited, turns around, falls down, comes at you like a vicious dog, loss of power in the hind quarters, growing worse and worse until relieved by death. You may be called to prescribe for an animal that has been bitten.

Treatment.—Use nitrate of silver or caustic potash freely upon the parts where bitten. If deep, you may excise part of the flesh, and then use caustic upon it. It may prevent it.

Tetanus, or Locked Jaw.—Tetanus signifies to stretch. It is essentially a nervous disease, due to irritation of the nerves. It is difficult to find exact changes in the nerves. If the animal dies quickly, not much change will be noticed. It is a very alarming, serious and fatal disease, but some cases recover. Locked jaw or trismus is applied to it, from contraction of the maseter muscles. Muscles principally affected are the voluntary. It receives various names from different muscles affected. Muscles of the back affected, opisthotonos, head and tail up; cannot lower the head. In empros thotonos, just the reverse takes place. If carried to one side, tetanus lateralis. But in horses, in five cases out of six, it is trismus. Opisthotonos differs from ordinary contraction of the muscles, in being of a tonic character. There is great pain. It is said to be of two kinds, receiving the names from the causes. If it is from a wound, it is traumatic; if it comes without any visible injury or operation, it is diopathic. There is really no difference, one being from a visible, the other from an invisible cause. It is thought to be produced by some derangement of the digestive system. Great quantities of worms, or bots, in the stomach, have been supposed to produce it. Any irritation acting upon the nervous system may produce it.

Pathology.—It is essentially a nervous disease, producing atonia. Generally affects the voluntary muscles; but others may be affected, even the diaphragm. In *post mortem* you will find different lesions in the spine, or great nerves, emanating from the spine or brain. Muscular tissue is extremely soft and flabby; portions placed under the microscope will be found to be altered to some extent. You have other lesions, as congestion of the lungs, but it will be from lying on one side. There are three forms—acute, sub-acute and chronic; acute most serious. Sub-acute more amenable to treatment; but acute laminitis is easier treated than the sub-acute.

Causes of Traumatic.—It is often produced by some injury or other, as picking up a nail, treading upon the foot. More likely to follow a punctured than an incised wound. Wound seems to be doing well, but in eight or ten days symptoms of tetanus appear, and may terminate fatally. May occur from some very trifling operation, as docking, nicking, castrating, although the operation was performed in the right manner; but more likely to follow improper operations, and has occurred from a blister. I will refer to one thing about castration. We find serious results from cold. Standing in water sets up irrita-

tion. Of twenty-four horses castrated, caused to be bathed in cold water, sixteen of them died. It usually makes its appearance just about the time the wound is healing; generally from six to nine or ten days. Supposed to be from the healing of the wound pressing upon the nerves. Highly nervous animals are more subject to it than the opposite. It is more common in warm climates.

Symptoms.—Soon become very prominent and alarming. It is easily detected; need have no difficulty in diagnosing the second case, if well marked. First symptom is a peculiar stiffness of the body; animal holds the head as if suffering from sore throat. Divisions of the muscles can be plainly seen, especially if he is excited. Jerk him suddenly and he will raise the head, and the membrane nictitans will come over the eye. This is a symptom mistaken for the cause of the animal's suffering, and this membrane has been removed. It is often about the first symptom noticed if he is excited. In such a case look at the mouth. It cannot be opened to full extent, if at all. Pulse not much affected unless animal is greatly excited. But the temperature is much affected, and if he is excited, the pulse may run up twenty beats per minute very quickly. Symptoms become more aggravated; jaws close tighter; saliva runs from the mouth; ears and tail erect; nose extended; great pain; retains sense until the last; will fall or lie down, and may not be able to rise, and death relieves the suffering. But in the subacute form, symptoms are not so well marked. The animal may be able to eat enough soft food to support him, but cannot masticate solid food. Death or recovery may take place in from three to thirty days. The more acute the symptoms, the more fatal the disease.

Treatment—Is sometimes satisfactory, although it is a very fatal disease. If the horse has been attacked for some time with aggravated symptoms, destroy him, but if he can eat, you may try treatment. There is no specific. Attend to the proper care of the animal; keep as quiet as possible; treat as a nervous fever; keep in a comfortable box, away from any noise; cover slightly but not too heavy. Give constitutional treatment—purgatives, six to eight drachms aloes; injections if costive; but use no treatment that increases the irritation—belladonna, one drachm two or three times per day. If the jaws are closed, place it back on the tongue. Try hypodermic injections. Prussic acid is recommended of late, given in the water if the animal can drink; or it has been passed into œsophagus through a tube. Woorari poison, chloroform inhalations, may relieve for the time. Bromide of potassium, I think, is useful in most cases of nervous affections. Feed upon sloppy food, hay and linseed tea, and do not drench to any great extent. Give almost any liquid the animal can take. You may have to use slings; may swing at night only. Blisters are not of much use. Cold applications might be tried. Use local treatment if due to any injury. If in the foot, pare down and allow the matter to escape, if any. You may have to take off the entire sole. Poultice sores, and use belladonna, two parts. Some use poultice of hyoscyamus. Bathe the parts well, but not if it excites. It generally takes twenty or thirty days before convalescence. Then give nutritive food and tonic medicines.

LYMPHATIC SYSTEM.

This system is formed of a great number of small vessels distributed throughout the body, beginning in a network of small vessels, imbedded in areolar tissue. These converge towards the lymphatic or absorbant system. Absorption goes on by various means—to some extent by the blood vessels. A swelling in the horse's leg is gotten rid of principally by the lymphatic vessels. It is a very important system. These vessels derived their name from lymph, the fluid they contain; called absorbants, because they absorb effete material. Chyliferous, or lacteal vessels, carry the milk-like fluid called chyle. It passes through the system for the building up the tissues. But all the chyle is not taken up by these vessels. The villi of the intestines take up some of it, and pass it into the blood directly. This can be seen in a subject, by killing it while digestion is going on. This system includes a great number of glands, called lymphatic glands. In some parts of the body they are collected in great numbers, especially about the groins, head, neck, and jaw. These vessels are very minute and delicate; cannot all be seen by the naked eye; more plentiful than veins. They are superficial, and deep seated. They contain extremely small valves, like veins. The whole lymphatic system of the body pours its contents into the venous circulation by two ducts, the thoracic duct and the lymphatic vein. Thoracic duct originates in the lumbar regions. It is guarded by a valve, and is the larger of the two. It receives all the others, except those of the right anterior extremity, the right side of the head, neck and thorax.

DISEASES OF THE LYMPHATIC SYSTEM.

Lymph Glands in the mesentery are called mesenteric. They vary from the size of a pin head to that of a pea

Lymphangitis.—Inflamation of the glands and vessels, known by many names, as water farcy, weed, shot of grease, inflammatory odima, big leg, Monday morning fever, etc. It is frequent in horses, and is likely to be more so, from being better fed. It is usually confined to the extremities, but may occur in the internal lymphatic glands. It is usually found in one hind leg; may occur in both, or even in the fore legs, and so puzzle you to some extent. The inflammatory action is set up in the glands, and extends into the vessels, and produces swelling. Heavy horses are more subject to it, from a more sluggish circulation, and some animals are predisposed to it.

Causes.—It is common in hard worked horses, by standing them in the stable, and giving usual amount of food. A larger amount of nutritive material is formed than can be taken up, which sets up the irritation. It is frequently found in certain stables on Monday morning; hence its name, Monday morning fever. Usual feeding without usual exercise is the most common cause in city practice; direct or indirect injury to the groin; prick in the foot; debilitated condition of the blood; excess of fibrine in the blood. The change in the breaking up of the tissue taken into the system, and over stimulating the glands also produce it.

Symptoms.—A certain amount of constitutional disturbance; may have severe rigors (which may not be noticed by the owner;) intense fever; lameness and swelling of the limb, usually of the inside of

the thigh, extends down the leg in a sort of hard cord; the line of the lymphatics plainly shown. There is difficulty in bringing the leg forward. Pressing on the cord on the inside of the leg causes pain, and he will lift the leg quickly. Swelling may extend entirely around the leg. It is very painful. Pulse full and bounding during inflammation. Usually the sthenic type of inflammation; pulse fifty or sixty beats per minute; breathing much affected; bowels costive; urine high colored; pain local and constitutional; will perspire, not profusely, but just bedews the body to some extent. Appetite gone, and great thirst, caused by fever, and if relief is not given soon, effusion will take place, and may take on suppurative process. In glanders we have lymphangitis, from poisen in the blood. Animal generally stands; does not want to move, but sometimes, from excessive pain, will lie down, and has great difficulty in getting up. Will look at the sides, as in colic. Sometimes milder in the fore than in the hind legs. The parts may regain their natural appearance, but it has a tendency to leave the leg enlarged, especially from repeated attacks. There is some lymph left, which becomes organized and cannot be removed.

Treatment.—If in a strong animal, from too much chyle, get rid of it as quickly as possible, by giving from eight to ten drachms of aloes; may give a little calomel; will derive benefit from tincture of aconite, eight to ten drops at a dose. Give nitrate of potash freely. Give clysters of soap and water. If inflammatory action is of a sthenic type, blood-letting may prove a benefit, but in many cases is not necessary. If you do bleed, do not give so much purgative. It is not material whether you bleed from saphena or jugular vein.

Local Treatment.—Judicious use of fomentations, but not too hot; your hand can bear more heat than the horse can. Use cautiously; bathe for two, three or four hours. It increases swelling, and encourages exudation. Keep heat to the parts as well as you can. Hay rope is quite good. Prevent reaction from taking place, by using mild stimulants, camphorated liniments. If there is pain, you may relieve with belladonna or laudanum. Keep the animal quiet. Give exercise after the inflammatory action has passed off, but not before. It does reduce the swelling, but it soon returns, and is more difficult to treat than before exercising. Give plenty of cold water. It is sometimes better to withhold food for twenty-four hours, and constitutional stimulants are not very useful.

Elephantiasis.—Thickening of the limb from repeated attacks of lymphangitis, and may result from one attack, but generally from repeated attacks. From the swelling there remains a slight swelling; some exudation is left. It swells again, and more exudations left; blood vessels pass into it; also nerves, and it is converted into new structure. If the animal stands over night, say twenty-four hours, the limbs becomes swollen, which exercise will relieve to a certain extent. It sometimes comes from repeated attacks of grease, but more likely to come from lymphangitis, especially if treated with hot liniments. If it is completely established, you can never restore the limb to its natural condition; but you may give gentle exercise. Give purgative, then diuretic medicine, and hand-rubbing and bandaging may be of use, if he is not fed too high, and is moderately exercised. There is another condition of the lymphatics from lymphangitis. It is a dilation of the lymphatics. The walls become dialated or veri-

cose; these small tubes become obstructed. This is most likely to occur in connection with elephantiasis. There may be rupture of the blood vessels, and not only of the vessels of the limb, but it may occur in connection with some of the internal vessels, in connection with the mesentery.

Tabes Mesenterica.—Affects the lymphatic system, especially the mesenterie glands. It is rare in the lower animals. It is sometimes a sequel of a debilitating disease, as strangles in very young animals. In young cattle it is quite common. In this disease the mesenteric glands become involved, and prevent the introduction of the chyle into the system, and the result is a gradual decline. It is due to tubercular degeneration.

Symptoms.—Great emaciation; feces pass in semi-digested state; pulse weak, not very quick, but quickened to some extent; belly pendant, or pot-bellied; muscular system soft and flabby. The animal dies a gradual, lingering death; abdominal pain in last stages.

Treatment not very satisfactory. Support the strength as well as you can by a generous diet. Give iodide of potash; feed upon the best of food. Iron is beneficial; cod liver oil has been recommended. I have noticed this from strangles, it usually terminates fatally. Post mortem reveals tubercular degeneration. There may be tubercular deposits in the lungs or some other organ as well.

Anasarca may come in connection with the limb, due to an accumulation of serous fluid. It comes from a percolation of the fluids into the flesh. It may contain a small amount of albumen. There are two kinds—inflammatory, and from venous obstruction. They receive distinctive names from the place in which the fluid accumulates. If in the thoracic cavity, it is hydrothorax. If in the cranial cavity, it is hydrocephalus. If in the tunica vaginalis, it is hydrocele. These may come from inflammation, or venous obstruction or debility. If from venous obstruction, they will pit upon pressure. It is sometimes found in the human, from standing up for a considerable time; not due to any particular disease, but may be symptomatic of some other disease, such as diseases of the lungs, kidneys and liver, in which cases you will have well marked symptoms in the organ affected, except in the heart. It generally occurs in the hind leg, and a term frequently applied to it is stocking. Heavy horses are more subject to it; legs swell at night; and it may come from well marked causes, as washing and not drying; exposure and hard work; horses kept in the stable during the winter, and then made to do a hard day's work in the spring, etc. Improper bandaging may produce it, and it is good practice to see to placing a bandage yourself, as it may be put on too tight, and so do more harm than good.

Symptoms—Swelling of the limb, and if not due to inflammatory action, there will be no pain, but in some cases there is some stiffness, and in some there is none. It is common in the spring.

Treatment.—Keep off work, and give a laxative; also change the feed, and give a good diuretic; three drachms sweet spirits nitre, three drachms rosin, and sufficient amount of soap, is good diuretic ball. If you cannot keep off work, hand-rub the leg well, and bandage, but not too tight. Or you may give more powerful remedies—white hellibore, one scruple to one-half drachm, or even one drachm. In cases where there is much swelling, give nitrate and iodide of potash; but

do not push diuretics too far, but give one or two doses, and then have recourse to tonics, regular exercise, and get the system in good condition; may give iron in the morning and diuretic at night, or vice versa. This swelling may have a great tendency to become organized. It is more likely to occur in a very old animal. Blisters are entirely inapplicable in such cases. Iodine ointment may be used in some cases, if you just wish to stimulate absorption to a certain extent. Another cause is undue pressure upon the limb. Injury to one foot, and standing upon the other, has a tendency to produce it.

Swelling of the Sheath is common. You can generally get rid of it by two or three doses of diuretic medicine, or it will get better when the animal is able to exercise.

THE EYE.

The eye is the immediate organ of vision. It is globular in shape, and is composed of a membranous sack, in which is contained transparent humors of different densities. The external tunic is the sclerotic and cornea; the sclerotic covers about four-fifths of the eye. The second is formed of the choroid and iris, a continuation of which forms the ciliary processes. The third or inner is the retina, which is a nervous coat. The sclerotic is formed of white fibrous tissue; to this are attached the muscles that move the eye. The cornea is transparent, and covers one-fifth of the eye. It fits into the sclerotic as a watch glass fits in its place. The choroid coat is made of three layers, external, middle and internal. The external vena consists principally of minute veins. The middle layer is formed of the ciliary arteries, forming a plexus. The internal is a pigmentary layer. The iris is a diaphragm or curtain suspended in the aqueous humor. It varies in color in man; in the horse it is generally of a light brown color. It is composed of two separate sets of fibres, circular and radiating. If the circular contracts, it contracts the pupil. This is involuntary muscular fibre. In foetal life it is covered by a pupillary membrane, which becomes absorbed before or soon after birth. The pupillary opening is in the center of the eye, and is elliptical or oval in the horse. There are several humors in the eye; aqueous, vitreous and crystalline lens. The aqueous is in the anterior and posterior chambers of the eye. It is principally water, and is secreted by the membranes which line the chambers. The vitreous humor occupies about four-fifths of the interior of the eye, and is enclosed in the hyaloid membrane. The crystalline lens is situated between the iris and vitreous humor. It is transparent and bi-convex. Its use is to bring rays of light to a focus. The name given to the small dark bodies just above the pupillary openings is corpora nigra. The retina is an expansion of the optic nerve. It consists of nine or ten different layers, composed of cylinders, cones, etc. The vitreous humor is about the consistency of thin jelly. It is covered by the capsule of the lens, and opacity of one or both of these gives rise to cataract. The appendages of the eye are, eyebrows, eyelids, conjunctiva, muscles, membrana nictitans, and the lachrymal apparatus; eyebrows are only rudimentary in the horse. The membrana nicti-

tans tends to throw off any offending matter that may get in the eye. This is composed of fibro-cartilege, and is for the protection of the eye, especially so to those animals that cannot protect it by using the fore extremities. The conjunctiva is the lining or mucous membrane, and it is continuous with the skin, and is reflected over the sclerotic, and firmly adheres to the cornea. The lachrymal apparatus is formed of glands and lachrymal ducts, sack, and a small opening in the lachrymal sack. This apparatus secretes and gets rid of the tears, and is called a conglomerate gland. These tears are carried down into the lachrymal sack, pass into the lachrymal duct and down into the nasal opening. In the superior and larger of the eyelids there are glands or ciliary follicles. They secrete a fluid which prevents the adhering of the eyelids during sleep. The muscles of the eye are eight, five of them straight. They are, retractor, abductor, adductor, depressor, and levator; one in the horse not in man, that which pulls the eye back upon the cushion of fat. There are three oblique muscles—superior, middle and inferior.

DISEASES OF THE EYE.

Simple Ophthalmia, Conjunctivitis, Traumatic Ophthalmia.—The first name is to distinguish it from periodic ophthalmia. It is inflammation of the conjunctiva, and the term expresses the pathology. It is more or less inflammation of the superficial structures of the eye, and may affect the cornea. Periodic ophthalmia first affects the internal structure, and extends outward.

Causes.—Result of direct or indirect injury—injury to the orbital process without any direct injury to the eye. May set up inflammatory action and extend to the eye; or, from whip-lash, grain of sand, hay seed, which the membrana nictitans does not remove. It may be produced by extreme cold, or extreme heat and sunshine, or extremely foul air. Extremely dark stables may also produce periodic ophthalmia and amaurosis. It may occur in an enzootic form. If it so occurs, it is generally due to very hot weather. Direct or indirect injury is the most frequent cause.

Symptoms.—There may be partial or complete closure of the eye, according to the cause; a copious secretion of the tears from overstimulation of the lachrymal apparatus; too copious to pass through the lachrymal duct, the eye becomes swollen. The upper eye-lid may present a greatly irritated appearance. Exposure to the light reddens the conjunctiva. These are followed by more or less exudation between the layers of the cornea. If caused from injury, this exudation takes place from the seat of injury. It is not due to a film, but due to an exudution between the layers of the cornea. In some cases there is some constitutional disturbance. Pulse increased just a few beats, but it is not a general thing. The eye presents an irritated appearance very quickly, and is sunken in its socket. The inflammatory action is more aggravated than in periodic ophthalmia.

Treatment.—If you think it is conjunctivitis, make a very careful examination. There is no great difference between this and periodic ophthalmia. Endeavor to detect the cause and remove it, or other remedies will be of no benefit. You may be able to remove it with a feather or handkerchief, and you may have to use forceps. When the source of irritation is removed, the irritation generally ceases, but you

may hasten resolution to a certain extent. If standing in stable, with cattle, etc., remove the animal. Apply fomentation to the eye, and keep up for some time; place the animal in a darkened box. If suffering to any great extent use an anodyne liniment, laudunum water and a little sulphate of zinc, and a little acetate of lead might be added, but it is not to be used in all cases, and belladonna is better in some cases than laudunum, especially if there is a tendency to inflammation of the iris, for it has a peculiar effect upon the iris, and may prevent adhesion. Use atropine, two or three grains to a quart of distilled water, or you put a small particle of it in the eye. This will relieve most cases, but there may be some irritation left, although you have removed the cause, and there may be small ulcerated spots upon the eye, and it may be necessary to use a solution of nitrate of silver, five grains to an ounce of water, or even ten grains to an ounce of water. You may apply it by means of a small syringe, camel's hair brush or feather. Just touch the ulcerated spots, to stimulate and bring on a healthy action.

In cases where the cornea is ulcerated, and even a fungus growth, you may have to touch it with a pencil of nitrate of silver. You may use iodide of potassium; but there is no use for very powerful remedies. In almost all cases of inflammation of the eye, there is a tendency to the formation of a film over the eye. In say twenty-four hours, if the irritation has been removed, this will often be absorbed without anything being done, but there are many remedies recommended for getting rid of this. Bathe with cold water, and stimulate with iodide of potassium and nitrate of silver, not too strong, but just gently. In case the exudation is broken up to a certain extent, and there is a tendency to abrasion of the cornea, stimulate every day or two, and keep this up for some time; this may come from conjunctivitis in a very mild form. When the film first shows itself, the owner is much alarmed. Iodide of potassium is used, five grains to an ounce of water, and it may be necessary to give diuretic or purgative medicines. Belladonna may be given internally and applied around the eye, but it is generally best to place directly on the eye. Treatment for the dog is tonics, good feed, and stimulate the eye with the remedies given. One or two applications will generally suffice. If you have a case of conjunctivitis that has come on very slowly, examine such a case very closely. There may be ulcerated spots. The remedies given increase the irritation for some time, but this will soon be relieved. Eyes are sometimes injured by severe caustics, pounded glass, alum, etc. In conjunctivitis you will find benefit from bleeding in the angular vein, and if it does no good, it will do no harm. In an acute attack the animal should be sparingly fed for a few days. There is no better remedy than belladonna. It may be necessary to scarify the eyelid in some cases. If it has received a severe injury, then apply fomentations.

Periodic Ophthalmia.—So called because it occurs periodically. It is not very uncommon in this country, and it differs from simple ophthalmia by the internal structures being first affected, coming from something in the constitution. It is a constitutional affection, operating on the organ of vision, first attacking the internal structure, then involving the whole of the anterior part of the eye, and sooner or later terminating in partial or complete loss of vision. Many other definitions might be given. Constitutional ophthalmia,

due to something in the system. Hereditary, due to some hereditary influence. Odontalgic, supposed to come from something the matter with the teeth. According to some authorities, wolf teeth affect the eyes. But I think they do not in any way affect the eyes. The fifth pair of nerves supplies common sensation to the eyes and teeth, and wolf teeth irritating this, affect the eye. But this is not held by veterenarians as a general thing. Another form is gouty ophthalmia, due to something in the system similar to gout, and acting upon the eye. This disease has been long known and great attention paid to it. Other names, moon-blindness, lunatic ophthalmia, supposed to be influnced by the moon. It was supposed that they could see readily at some periods of the moon, while at others they could not. I think it is more common here than in Britain, perhaps owing to the extremes of heat and cold. But there are other causes which operate in causing it, and it receives various names, arising from the various symptoms produced. Pathology is not very well known at present; perhaps a great many cases are due to hereditary influence. It was once considered the bane of horse-flesh. Breeding from sound horses has done more to eradicate it than anything else. "Like begets like."

Causes.—Certain excitants, extremes of heat and cold, are prominent causes; dark and ill-ventilated stables; working and neglecting the horse, but in most cases there exists a hereditary predisposition. I do not say in all; there may be exceptions. Lexington, a well-known horse, suffered from periodic ophthalmia, supposed to be the result of hard work, and his progeny is affected to a considerable extent. It may not attack the first, and then attack the second or even the third generation. In such cases it is easily produced. Breed only from sound, healthy animals. I would not breed from a horse, no difference what his conformation might be, if affected with this disease.

Pathology. — A constitutional affection, which localizes itself in the organ of vision. The inflammatory stage may pass off, even without remedial aid, and then it takes on the second stage of the disease.

Symptoms.—Very well marked in many cases, together with the history of the case, the eye having been affected some time past, but got better, then worse, etc.; was taken suddenly; increased secretions of tears; was put in the stable at night all right; in the morning was suffering from an irritation of the eye, supposed to be an injury; the eye weak, and cannot tolerate the light. Upper eyelid droops to some extent; eyeball retracted. This can be noticed especially if but one eyeball is affected; you cannot always notice this unless you expose the animal to the light. Conjunctiva reddened and congested to a considerable extent, but not so much as in simple ophthalmia; a kind of a brownish-red, hazy appearance of the cornea. In periodic ophthalmia this opacity begins at the circumference and radiates toward the center. As it advances the eye loses its transparency, becoming of a yellow or reddish appearance. The circulation may be altered to a slight extent; may be slightly quickened; animal somewhat dull, dullness not very well marked, however; discharge of tears. After a few days the inflammatory action gradually subsides, the products of inflammation become absorbed, irritation gradually ceases, color changes to a grayish color, and the eye may regain its apparent natural condition, but not in all cases. It may have slight opacity of the crystalline lens, and produce cataract, but this does not often occur from one attack. I think in most cases

there is some weakness remaining, although the irritation appears to have subsided. The eye may look smaller, and is more affected with the light. It will be retracted in the socket. Slight change of the weather will cause a slight weeping of the eye. Another peculiarity of this disease is shifting from one eye to the other, not from sympathy; no sooner is one eye relieved than the other is attacked. In such a case you may make up your mind that you have periodic ophthalmia. Apparent recovery is very rapid in some cases. To all appearance the animal is perfectly sound, but it comes again with greater severity, and it continues to recur at variable periods, from three days or weeks to months, or even a year, and we have some some cases on record of animals having one attack and never having another, but there is no particular time at which it is likely to recur. After cataract is formed there may be inflammatory action in the eye, but after the eye is completely disorganized, as is sometimes the case, inflamation does not affect it further. As to the duration of the disease, it may vary from three or four up to ten or fifteen days. It is sometimes developed in the acute form, but generally in the sub-acute form. An animal may suffer from one or two attacks, and appear pretty well without any well marked cataract. It has been noticed that horses working in coal pits, under ground in dark places, suffer frequently from amaurosis, and also from ophthalmia. The mode of using being the exciting cause.

Treatment.—Is anything but satisfactory, and it sometimes grieves the owner to be told that sooner or later his animal must become blind. The irritation may be palliated by rational treatment. Place the animal in a well ventilated and darkened box; but you may have to allay irritation and keep the animal at work. Give a moderate dose of purgative; it acts upon the system and allays irritation; bathe with tepid water and laudanum. You may give extract of belladonna in drachm doses, and rub along the eye-lids, or you may use the active principle in the eye, but it is not necessary unless the iris is affected to a considerable extent. There is benefit in nitrate of potash and iodide of potash. Iodide of potash and colchicum, one drachm each once or twice a day. If the acute symptoms have passed off, the clearness may be hastened some by iodide of potassium and nitrate of silver. Treatment does not do much but palliate the disease. Apply something to allay the irritation of the eye—warm water, or in some cases cold water. If the iris is much affected, I think belladonna is the best thing that can be used. Blisters have been used to a great extent, but are not of much benefit. A little counter-irritation may be of use; first, subdue the inflummatory action the best you can, and expedite the removal of the products of inflammation. In most cases it terminates in cataract.

Cataract means a breaking up. Cataract may be capsular or lenticular; the lens may be entirely destroyed, or only a slight deposition which impairs vision to a slight extent. May have cataract, opacity of the lens, or capsule, and so prevent the passage of light. Cataract is the result of periodic ophthalmia, but it may result from some other cause, or without any observable cause, and may be due to some nervous influence. You may have cataract without any noticeable irritation at all. If capsule only is affected, it is called capsular. If the lens, it is lenticular. It is a pearly white deposit.

Result of Ophthalmia is cataract. It is a term applied to what we

call opacity of the crystalline lens. Either the lens itself or the capsule investing the lens, and thus it gets different names, as capsular, lenticular, and capsular-lenticular. It is the result of ophthalmia, but it may occur independent of this, from an injury, or without any irritation of any consequence whatever. But this is not a common occurrence. It is generally due to repeated attacks of ophthalmia. There is true and false or spurious cataract. The true is opacity of the crystalline lens, its capsule, or both lens and capsule. There is an opaque deposit of lymph pus or blood on the anterior capsule. It may involve the entire lens, or only a part of it. There is a pearly white deposit in the anterior part of the eye. Cataract is said to have been absorbed, but it was, I think, not true cataract, but false—animal having suffered from injury or something which gave rise to effusion, but it was a spurious form. Cataract is occasionally congenital, *i. e.* at or soon after birth. If born blind, it is generally in both eyes. Complete cataract is incurable.

Symptoms.—If it is of any size and involves the crystalline lens, it is easily detected. According to its size and position, there is either partial or complete blindness. Cataract may be present to some extent and not produce complete blindness. If small, it is not so easily detected—it may be overlooked. If it is small, the pupillary opening is contracted if exposed to the rays of light. If it is completely formed, the iris loses its natural condition, and does not contract. The pupil and the retina may at the same time lose its natural condition, and you have amaurosis and cataract. It requires some experience to detect it. If you are examining a horse, take him suddenly from the dark to the ligh, and watch closely. If the pupil contracts quickly, there is suspicion of some irritation. Take a black hat and shade the eye, and notice the pupillary opening, and you may be able to detect it. But if you still have doubt, place the animal in a dark box, and let him stand fifteen minutes, and then take an artificial light and bring in front of the eye, and watch, and you will sometimes be able to detect this white pearly deposit, but be sure that it is not a reflection you see. There is another way: by noticing the images reflected in the eye. There will be three; one reflected from the cornea, one from the anterior surface of the crystalline lens; these two move with the light, and are upright. The third is reflected from the posterior surface of the lens, and is inverted, and moves in an opposite direction from the light and the other images, and you may see these where there is a slight disease of the vitreous humor. These images appear as stated in a sound eye. You may act upon the animal with belladonna, for the purpose of examination. You may detect a small speck not larger than a pin's head. With some practice cataract can be easily detected. Watch both eyes, and if one contrates more than the other, it is symptomatic of cataract. It is a disease which may be quickly developed. Prof. Williams gives an account of one case that formed in ten days. But you are generally safe in giving your opinion that it has been present some length of time, if it is well formed.

Treatment.—Very little, if anything, can be done, unless it is done as an operation, and such an operation is not attended with much success in the horse, as the light must be regulated by means of glasses, which would be difficult. It is possible, in a case where there is a deposit of lymph, to restore the eye to its natural condition. If cataract is forming, you may give some of the remedies already recom-

mended. Inflammation ceases after cataract is formed. Another disease of the eye is

Amaurosis.—It is a diminution or complete loss of vision without any visible effect in the eye. It is paralysis of the optic nerve and its terminal expansion. It may occur independent of any irritation, and is usually incurable. It is sometimes found in connection with parturition. It may exist with disease of the digestive organs, and frequently co-exists with cataract, and may result from injury to the brain or optic nerve.

Exciting Causes: Standing in dark stable (similar to coal pits); may occur from a comparatively slight injury, as striking the head against something. There is nothing to obstruct the passage of light to the posterior part of the eye. You have amaurosis in severe hemorrhage. It occurs in bleeding a subject. It may be quickly developed. It has been noticed to occur from secondary hemorrhage from castration.

Symptoms.—A dilated pupil is the principal symptom. The pupil loses its elliptical form and has a glassy appearance; hence it is called glass-eye. Both eyes are generally affected. If there is no other disease present, the animal carries the head high and steps high, and from his action is sometimes called a star-gazer. Perhaps just at a glance you cannot detect it. Try the artificial light; put him in a dark box and bring a lighted candle near the eye, and the pupil does not contract. Some good judges sometimes get bitten with this. You cannot detect it just at a glance, but after some time a change takes place. You have generally a pretty full eye.

Treatment.—Incurable if of long-standing; but if just due to some slight injury to the brain, or derangement to the digestive organs, etc., try iodide of potassium, belladonna, and then try nerve stimulants. A horse is better blind than with impaired vision. Another disease of the eye, of a very serious nature, is

Cancerous or Bleeding Fungus—Medullary sarcoma, or bleeding cancer. It is of a malignant character. It is a spongy inflammation of the eye. This disease generally arises in the ball of the eye, but there may be exceptional cases, and it may come from injury, but most cancerous growths come from constitutional derangements. A slight exudation might cause it. In the first stage the eye becomes changed; there is opacity of the crystalline lens; this may, by and by, become absorbed. This growth makes its appearance in the posterior part of the eye. It becomes larger and involves the entire eye and surrounding structures. It may grow and hang down over the cheek, and give the animal a very unsightly appearance. It may produce caries of the bones near the eye.

Treatment.—You may effect a cure in first stages. If the eye ball is destroyed, remove the fungus and the eye-ball, which may be attended with success. But in other cases it will grow again quickly. There will be hemorrhage, which can be controlled by styptics, and it is not a bad practice to touch with actual cautery; then use styptics, astringents, etc. If this is removed in the early stage it may not be reproduced, and if reproduced it may not be for some time. It occurs in cattle, and the same treatment is to be used. Injury to the cornea might excite it. There is a bulging of the cornea, about the size of the end of a finger. It is very vascular; when cut into, it bleeds

readily. As well as local, give constitutional treatment. After cutting it out, you might give a few doses of medicine, tonics, etc.

Filaria Oculi, Strongylus Equinus —There is scarcely any tissue of the body exempt from parasites. They are found in the liver, testicle, brain, bronchial tubes, kidneys, lungs, muscles, the eyes, etc. It is noticed in the eye, in Canada and the United States, but it is very common in India. It has never been noticed in England. This parasite is most likely to be found where the animals are grazing on wet land, or in wet weather. They get into the eye by means of the circulation. The ovum is taken in by means of the food or drink, gets into the stomach and is carried through the circulation until it finds its way into the aqueous humor of the eye. May grow to the size of one-half inch to two inches in length; sometimes set up considerable irritation, and this gives rise to more or less opacity of the cornea. It is not generally entirely opaque. These worms move about in a lively manner; appearing near to the cornea, and then passing away and disappearing to a certain extent. You should have no difficulty in detecting this by a careful examination. It might be mistaken for a shred of lymph, but in a short time it removes and again appears.

Symptoms.—More or less irritation of the eye; may be noticed by the owner or attendant, and you have some history of the case. There is a haziness of the eye, but if you look for some time you will see something inside moving about, first one way and then the other. It has been described as an eel in water. If you meet with this you must remove the worm, for if you allow it to remain, it will in most cases destroy the eye. Whether it is advisable to remove it while the irritation remains, or wait until it subsides, is a controverted point. I think the sooner it is removed the better. Cast and secure the animal, elevate the head to a certain extent, and with a guarded lancet make an incision and allow the aqueous humor to escape, and with it the worm in most cases. There is no great danger to be apprehended; keep the animal quiet and apply cold to the eye. You might give laxative medicine, good food, etc. A slight speck remains sometimes where the incision was made. If you operate on a case, and the aqueous humor escapes and the worm does not, just leave it alone till the aqueous humor is reproduced, and the worm may be absorbed, or you may take it out, but it sets up considerable irritation. It is better to let it alone until the aqueous humor is reproduced, and then operate again. Some operate without throwing the animal, but I think it is not best, you may make a larger incision than is desirable. The lancet used in human practice is the most applicable. Keep in a darkened box, and if slight opacity is present, you may use iodide of potassium internally.

Glaucoma.—If there is either amaurosis or cataract, you have this condition present, but you may meet with a case where this is seen without any other disease. The vitreous humor becomes hardened, more or less, and a dilated pupillary opening; big head or osteosarcoma has a tendency to produce it. Little, if anything, can be be done for it. If it is in an old animal from natural decay, as is generally the case, nothing can be done. The eye-ball is occasionally injured, frequently from a punctured wound, and letting the aqueous humor escape. If the vitreous humor or crystalline lens escapes, vision

is totally destroyed. The aqueous humor will be reproduced, but there may remain a slight opacity of the cornea.

Treatment must vary as to the severity of the injury. If a puncture is received and the crystalline lens is injured there will be great pain present. Foment, use belladonna, give a purgative, and may give an opiate; poultice judiciously with linseed meal, bread poultice, etc. You may find a fungus growth, from puncture or other injury, and you can generally get rid of it with a solution of nitrate of silver. But this may not be strong enough, and you will have to touch with a pencil of nitrate of silver. After this you may have a small speck, and if there is exudation around the speck, you may relieve by judicious stimulation. In some diseases or injuries to the eye, the parts do not heal up, a discharge of matter takes place, and it is better in some cases to remove the tissue of the eye. Another condition of the eyeball is dislocation, more likely to occur in dogs than in other animals, from fighting with other dogs and cats. If it does occur in the horse, the tissues are generally lacerated. If you see such a case soon after its occurrence, the eye may be replaced and remain placed, if done before the swelling is too great. After replacing, apply fomentations, as to other injuries to allay irritation. But if it is down over the cheek and much swollen, the only thing that can be done is to remove the eyeball, and treat as an injury. If it requires much pressure upon the eyeball to replace it, you can just snip the outer angle of the eyelid, and after the ball is replaced just put a stitch in the cut and then use something to allay irritation. Melanotic deposits may take place in the eye. They are commoner in gray horses than others, but may occur in any, and they may occur in any part of the body; if in the eye, there is a reddened condition of the eye. Nothing whatever can be done for this.

Ectropium or Eversion of the Eyelids; Entropium or Inversion of the Eyelids.—Eyelids become torn and injured in many ways. If you find the lid torn and injured be as conservative as you can and bring the parts together nicely, using a suture of silk thread or wire. Although it is pretty well detached, bring the parts together the best you can and do not allow any part to hang down, or it will bring on suppuration, and if any part is removed, it interferes with the animal to some extent.

After-Treatment.—Allay any irritation. Keep the animal quiet, and secure him so as to keep him from rubbing, by tying to both sides of the stall. Keep up the application of either cold or warm water, but cold water generally has a better effect than warm. There will be more or less opacity of the cornea, but when the irritation is allayed, the opacity will disappear. If a large portion of the lid is torn loose and nothing has been done for it until suppuration has taken place, and it is much swollen, then scarify and treat properly, and there is a possibility of recovery. In some cases you will have to remove the partially detached portions, but do not be too hasty about cutting.

The Membrana Nictitans sometimes become inflamed in connection with ophthalmia, or it may become irritated without this. This interferes with the secretion of the tears passing into the lachrymal duct, and they flow down over the cheek.

Treatment.—Applications of cold or warm water. Cleanse nicely and touch with mild astringents. Sulphate of zinc, five grains to one

ounce of water, and about one-half drachm of laudunum, which you may inject with a small syringe. This membrana nictitans sometimes becomes diseased, until we have to remove it from the eye. If it is ulcerated but slightly, try a caustic upon it, such as nitrate of silver, and if this does not do, it may be necessary to remove it.

Lachyrmal Ducts and Passages.—When the tears are secreted, they pass into the puncta lachrymalia, then through the lachrymal canals, and enter the lachrymal sack, and then into the nose, through the lachrymal duct. These lachrymal passages become diseased, obstructing the flow of tears. This is due to various causes: due to an enlarged condition of the caruncula lachrymalis, or from the thickening of the lining membrane of the duct. This thickening may result from various causes, and may result from catarrh, or from a foreign body passing through some opening into the lachrymal sack, and interfering with the passage of the tears through the duct.

Symptoms are well marked, and there is not much difficulty in detecting it. Nostrums put in the eye will have no effect if the cause is within the duct; if from the thickening of the mucous membrane, the tears will pass down the outside of the cheek and destroy the hair to some extent, and there may be a purulent discharge from the inner angle of the eye; the eyeball will be irritated. If the obstruction is down in the duct, the lachrymal sack may be enlarged, and if this is the case, if you lift the head, it sometimes causes this discharge to flow more freely. Examine as to the anterior opening of the duct, inside the nose.

Treatment.—If from obstruction, remove it; and the best way is to inject the duct with tepid water; then with a solution of sulphate of zinc; and it is better injected from below than from the upper opening. Take a glass syringe with a long nozzle, and the fluid may pass through easily; and it may not pass just at once, but keep up injections for some days. You may use carbolic acid, but no strong application is useful. Keep the eye nice and clean. Some authorities recommend the introduction of a probe. If you fail from lower opening, then try the upper, but the latter is more liable to irritate the eye. It is sometimes necessary to throw the animal in injecting from the upper opening.

Congenital Malformation, in which no duct is formed. It may be formed through the bone, but not through the soft tissues, or only the mucous membrane is left to obstruct it; there will be a discharge from the eye; lift the head, and there will be this purulent discharge from the lachrymal sac. An artificial opening may be made, and allow the tears to flow through it to the outside of the cheek, instead of out at the eye. If the opening is just closed by the mucous membrane, just make an incision and let the tears pass through the opening into the nose. You may trephine and make an opening from the duct to the outside of the cheek. There may be fistula of this duct, and the depression of the bone may interfere with the flow of tears.

The Eyelids may be inverted or everted; the one turned in, called entropium. It may occur in the lower eyelid, but not frequently; oftener seen in dogs than horses. When this occurs the eyelashes rub upon the eyeballs, which irritate it and causes a prosecretion of tears and a purulent discharge. Bring the parts

into proper position, just by incising a small portion of the skin, and use a suture, and this may suffice, or you may have to pull the hair from the eyelids or cut a portion out, and bring the cut edges together with a suture, just dipping the thread in a solution of carbolic acid. We also find just the opposite of this takes place, called octropium, or eversion of the eyelids. It proceeds from various causes; may proceed from simple ophthalmia. Scarifying may bring it to its natural condition, but if it continues it interferes with the animal very much, and makes him quite unsightly. This is also more common in the dog.

Treatment.—Varied according to the case; if just due to congestion of the mucous lining, scarify and it may do, but you may have to use caustics—nitrate of silver solution, or even a pencil of nitrate of silver, and if you cannot subdue with caustic, then you excise the parts with knife or scissors. After-treatment bathe the eye nicely, bring the parts as near the natural position as possible. The cornea is mostly affected.

Caruncula Lachrymalis may become enlarged from ophthalmia or injury. The irritation is reduced by fomentations, astringents, etc., but if this does not answer use the knife or scissors, then allay the irritation. Some use a ligature instead of the knife. There will be opacity of the cornea, which will disappear as soon as the irritation subsides. We notice in horses, the same as in man, that some have better eyesight than others; some near and some far-sighted.

Myopia, being near-sightedness; due to too great a convexity of the eye. The animal may have an apparently well formed eye, but he will shy, no doubt due to defective vision, which is difficult to detect even in human patients. There is just the opposite of this, far-sightedness, which is most likely to occur in old animals and old persons.

Glaucomatous Condition of the Eye. — The vitreous humor loses its transparency, and becomes bluish in color; osteosarcoma may produce it. You sometimes meet with a kind of ossification of the eyeball.

Melanotic Condition of the Eyeball.—A condition called staphyloma, from its resemblance to a bunch of grapes; it may come from a tumor; use caustic nitrate of silver. There is a bulging and opacity of the cornea, and if the exciting cause continues there is complete opacity of the cornea. The remedy is to puncture the cornea and let the contained fluids out. Perhaps there are chances of recovery. It is apt to be associated with some constitutional disturbance, and vision is likely to be lost.

CONTAGIOUS DISEASES.

Variola.—This is a disease that occurs in all domestic animals, and perhaps in wild as well. It is an eruptive febrile disease, so called from a peculiar spotted eruptive appearance on the skin. Small pox has affected many people in many countries. It may be

described as an acute febrile disease, and like all febrile diseases runs a certain course, then there is eruption of the skin, either vesicular or pustular. It may occur in a simple or complicated form; it is first vesicular and then pustular. It belongs to the zymotic class of diseases, due to contagium in some form or other. This contagium is in either a fixed or volatile form. In the cow it is in a fixed form. In the sheep it is almost as well marked as in cows. It is a difficult matter to say just how contagium may be carried and disease produced; there are well marked stages. The system receives the contagium in some form or other. There is the incubatory stage, which may be from three to six or nine days. Next is the febrile condition, which may be ushered in by slight rigors, giving rise to quickened pulse, impaired appetite, pains in loins, back, etc., then eruptions of the skin, small reddish nodules about the size of a pin head, and larger, with a reddened surrounding, then formed into vesicles filled with a clear, transparent lymph. The contents of these become purulent; then it becomes pustular, and is the second stage. The third stage is a drying up of this purulent matter, and a dark brownish crust is formed, detached, and falls off in scales. There is a primary and a secondary fever—the secondary being the more dangerous—caused by absorption of this matter into the system. The fever is more severe just before the eruption becomes complete. The blood being in a state to give rise to these irruptions, also gives rise to great fever, intense headache, etc. In man, the secondary fever is caused by some material becoming absorbed. This is not of a fatal character—except small pox in sheep, where it is just about as fatal as small pox in man. It can be conveyed from the horse to the cow, man, etc., the cow being the place where man gets his variola.

Variola Equinae, or Horse Pox.—It is occasionally noticed in this country and in Europe, but not so common as cow pox. It may be characterized as an eruptive vescichlo-pustular disease, preceded in most cases by more or less fever, which may be comparatively mild, and may be entirely overlooked; a slightly quickened condition of the pulse—forty-five beats per minute, or even more—appetite somewhat impaired. The eruption shows itself upon any part of the body, but more particularly about the lips, heels, nose, mouth, nostrils, etc., and can be more readily seen in white-skinned horses. Some say it affects the schneiderian membrane. It can be communicated to man and the cow, and I believe to some other of the domestic animals. It may be characterized as a blood disease, due to a virus or poison. The virus is generally in a fixed form; some say it is in a volatile form; I think it is in a fixed form.

Symptoms.—There is more or less fever; pulse comparatively weak, and may be quick; increased thirst; impaired appetite, but not generally gone entirely; red disc-shaped patches appear upon the skin, each having a depression in its center, from which the pustules are developed, from which exudes more or less serum. They vary in size, according to the situation they occupy; they are larger in the heels, on account of there being a greater number of sebaceous glands. These pustules may become confluent, and parts of the body may become one large sore. The schneiderian membrane may present an ulcerated appearance. These ulcers have a great tendency to heal, while in glanders they will not heal. There is a discharge of saliva if the mouth is affected; masticulation performed with more or less

difficulty. It may extend and involve the throat and even the intestinal canal. It usually runs its course in from eight to fifteen days, and until the scab begins to fall off, or convalescence, is about three weeks. This may be conveyed by contact in various ways—by the groom's clothes, saddles, harness, and may be given by inoculation, as irritating the skin and rubbing some of the matter upon the place.

Treatment is simple: cleanliness, a laxative diet, food such as will act upon the bowels, bran mashes, linseed meal; or if in summer, give green food; give hypo-sulphite of soda, nitrate of potash and sulphur in small doses. The danger is in checking the eruption. It will get well readily if properly treated. The animal must not be exposed to the cold. Give something to increase the eruption, instead of trying to stop it. Give something to act upon the blood. For a local application, sulphate of zinc ointment, carbolic lotion, etc., but it does not require much medicine; give good, easily digested food. In all diseases of an eruptive character, if checked, it leaves the poison in the system.

Variola Vaccinæ—cow pox; oftener seen in cattle than in the horse, and has been seen in every quarter of the globe—in some places in a very severe form, and attended with great fatality, but in Britain and America it is not fatal. It is an eruptive pustular disease, and usually shows itself on the udder and teat, but it may attack the feet and mouth. It is more severe in cattle that are continually housed, but it occasionally occurs in animals running in pasture. It runs about the same course as in the horse—first, incubatory, febrile disturbances and eruptions.

Symptoms.—More or less fever; falling off of milk, if in milk cow. Appetite slightly impaired; slight increase of temperature, if examined. Then it shows itself by eruptions, especially about the udder; but a slight eruption takes place, presenting a reddened condition, and may become confluent; the teat may be one mass of pustular eruptions; one person's milking ten, or perhaps twelve cows, tends to spread it. If you meet with two or three cases, showing such symptoms, it is a little suspicious, but it may be caused by some local irritation, as running through long grass, irritating the parts; and if kept in for two or three days, the irritation subsides.

Treatment.—Cleanliness; bathe the udder nicely with tepid water and astringents, acetate of lead, carbolic lotion; covering the teat with milk is beneficial. Give sulphur, hypo-sulphite of soda, laxative diet. If irritated by the flies, keep up during the day, and let out at night. The virus is in a fixed form. It is a disease that occasionally occurs, and is of great importance, for this is where we get our vaccine matter, which has been of great benefit. The pig is also liable to variola. The virus is in both a fixed and volatile form in the pig. When the pig becomes spotted, called spotted fever, it may be due to variola. Give salines, laxatives, epsom or glauber's salts; good nourishing food. The dog is also liable to variola. The virus is in a fixed form. The eruption nearly the same in all animals, and the same stages in different subjects.

Contagious Pleuro-Pneumonia is not communicable to any other species. We have two kinds: sporadic, which runs its course quickly, and contagious, in which there is a great amount of fever, and is sometimes classed as an infectious fever. It is a disease which is interesting to some people in this country, as it exists to a more or

less extent in America. It is a disease that has been known for two hundred years in Russia. During the present century it has gradually made its way from the east to the west. It was noticed in Prussia in 1802; in northern Russia in 1824; in England in 1841; in America in 1843. It occurred in Australia in 1815, having been carried there by cattle from England. Therefore, at present, it seems to be due to contagium, in some form or other. It is a specific contagious disease, peculiar to cattle. Due to a blood poison, acting upon the system in general, and it shows itself, in particular, in the lungs. It appears in both acute and sub acute form, and we cannot communicate it to any other animal than cattle. In a great many cases it is in the sub-acute, and proves a very serious disease. It implicates the lining membrane of the lungs and chest, and the lung substance as well. And if an animal recovers, it will not be attacked again; it never occuring twice in the same animal. There is difference of opinion as to whether it is spontaneously developed or not, as it is difficult to say just how it occurs in many cases; it has given rise to these differences. But it is due to contagium in some form or other. There are various stages, the first consists of an incubatory period, varying from two to six weeks, or even longer, and perhaps the first thing that will be noticed is an increased temperature of the body, to 103, 104 or even 105 degrees. Often before any other signs are developed, there may be slight rigors or shivering, but so slight as to be overlooked. After this, the system becomes impaired. If in milch cow, the secretion of milk is impaired, and there is a slight cough, noticed more in the morning, especially if the animal was kept up all night. The disease gradually grows worse, and the cough increases; this may be the only symptom for some time. The animal was thought to be only suffering from a slight cold. After a while the lungs become affected, giving rise to quickened breathing. Animal gradually loses condition; becomes emaciated; hide-bound condition of the skin; a discharge from the nostrils of a whitish, or even a fetid character. In the first stages, you can, by ausculation, detect a grating sound, due to plural surfaces rubbing together. Concussion reveals a dull, dead sound. In the second stage the pulse is very quick; usually symptoms of fever; dryness in the muzzle. The horns may be either cold or hot, and the temperature and cough increased. Cattle, when suffering, lie upon the sterum, in order to relieve the pressure. If likely to end fatally, the discharge becomes fetid; may have slight diarrhea, followed by constipation; a peculiar gritting of the teeth; moaning or grunting; the eye has a glassy appearance; debility, and death.

Post Mortem Appearances.—After those changes have taken place in the lungs, the blood becomes affected, and then the inter-lobular tissue of the lungs, and exudation takes place; the air cells become gradually obliterated, and you have a solidified or hepatized condition, but the animal may die before hepatization sets in. The lung is increased much in weight. The lungs present a marbled appearance, but this is characteristic of inflammation of the lungs as well. The pleura is also affected, and covered with a slight fibrinous exudation; there is also effusion of serum or hydrothorax, mixed with fibrinous clots. In this disease, there is sometimes suppuration. Parts of the lungs may become encysted, and the animal live even after this for years. The sporadic form is usually quickly developed, while the contagious form is more of a fever at first, and then progresses

afterwards. The contagium is said to be in both a fixed and volatile form, and the virus more powerful during the first or febrile stage. It is most likely to be conveyed by means of the breath, and the virus will retain its activity for several months. There is some difference of opinion as to how it may be conveyed, but it is supposed to find its way into the system through the respiratory organs. Blood has been given to healthy animals without producing it, and diseased lung has been tried with like effect. However, it may be taken in by other ways, but most likely through the respiratory organs; and it may exist without showing well marked symptoms. It spreads rapidly over a great scope of territory. It may be carried on the cars, and it is said that it has been carried on the clothes of people. It may be possible, but it is said that animals must come in contact, as a general thing. The per cent. of loss from this is much greater when it first appears—the loss varying from thirty to eighty per cent. This disease has inflicted great loss in some countries, but it is not so fatal as rinderpest. America has suffered some loss, and I do not suppose has ever been entirely rid of it since its outbreak.

Treatment has been attended with much success; but febrifuge and judicious counter-irritation have been used. The disease should be stamped out without trying to treat it, and that would be more successful than treatment. However, after it gets into a country, spreading over many hundreds of miles, even then prophylactic treatment is better than curative. It is not so extensive as formerly, as the animals are destroyed, and the owner is, in some countries, compensated. To prevent the disease, I believe in inoculation. This was recommended in 1852. It was tried, and considered a benefit, and then was thought of no benefit; but now it is supposed to be of great benefit. The virus for inoculation is taken from the lungs at a certain stage of the disease, and is put into the tail or other part of the animal, which brings on a febrile stage. But pleuro-pneumonia is not produced only in exceptional cases; but it prevents the attack of the disease. While the animal is under the influence of this it can convey the disease to other animals. I believe inoculation will mitigate a great many diseases. It has been practiced in Long Island, not by professional men, but by some owners and dairymen.

Glanders is contagious, a most serious and loathsome disease. It has been known for thousands of years, and has been treated with almost every medicine in the pharmacopœia, and nothing has proved a remedy, and veterinarians have been abused for not curing it. They have pointed out the true character of it, and it is now rare to what it was thirty or forty years ago. It was common in Canada when the country was being cleared up, but it is now rare; it is still seen in some of the back townships. This disease consists in a discharge from one or both nostrils, which discharge will produce it in another horse and in man. It produces tumefaction of the schneiderian membrane. It is found generally in the horse, and in man, but is said to be communicable to sheep, dogs, cats, and even to cattle, but there is doubt about this. It is a specific disease of a contagious character, due to the introduction of a poison into the blood, or to the generation of a blood poison within the system. It is contagious and infectious. These two terms are used for the same thing, but do not mean just the same; the volatile form being infectious, the fixed being contagious. Although mostly due to contagium, it is sometimes

spontaneously generated. It is most severe in countries where horses are kept in a highly artificial manner, while in countries where they are allowed to run out during the most of the year, it is not so common. It was not known in Mexico until the war with the United States. It is said it does not exist in Australia, and is seldom seen in India except in imported horses, as their horses run out the most of the year. It is supposed it got into India by shipping horses; during their passage the hatches being shut down during a storm, in which case it was spontaneously generated. With glanders we also have farcy. They are, I believe, essentially the same disease, only differing in their manifestations. I never saw a case of farcy get well, but many say it does get well. Farcy will produce glanders, and glanders farcy, by taking the virus from one or the other. So both diseases are due to a blood poison essentially the same, but they differ in their external manifestations. It is said to occur in other animals; but it is seldom met in any except the horse.

Causes.—Some say it is, and others say it is never, spontaneously generated. We have germs which we cannot account for, but we have striking examples of it being spontaneously produced. I think I saw one case which had catarrh, placed in a poor place, poorly attended, poorly fed, manure allowed to accumulate, etc., during the winter, and in the spring it had glanders; and we have many such instances from many practitioners. It is supposed to have been produced on shipboard during a storm, by shutting down the hatches, but there may have been an infected horse among them, but the veterinarians were very careful in examining. It prevailed during the American war and the Prussian war. The horses were supposed to be free from all such diseases. I think it is usually due to contagium, but it may be spontaneous. It can mostly be traced to contagious influences. It is likely to occur most severely in large cities, where many horses are kept together, for if one horse gets it it pollutes the air, and it spreads rapidly. There may be a glanderous diathesis in some horses, so to speak. It occurs in two forms, acute and chronic. If developed in the acute form it runs its course very quickly; but it is generally seen in the chronic form; seldom met with in the acute form. It is generally seen in old and debilitated animals. When such become exposed they take it more readily than young, healthy animals. It is similar in men.

Symptoms.—After it arrives at a certain stage it is easily diagnosed, but until then it is not. It may continue for a long time without showing any constitutional disturbance, and it may be mistaken for other diseases. Some are liable to think that it is nasal gleet, unless the animal soon dies. Just in the early stage of the disease the animal suffers from rigors, more or less. Temperature is increased to 103°, 104° or 105°; then it will go for some time, and then there is a discharge from the nose, which varies much, according to the disease; at first watery, and then purulent, coming more freely in some cases than others. It may be from one or both nostrils—usually from one, and that the left. By and by there is a cough, which may continue; the discharge altered to some extent; the most noticeable peculiarity of the discharge is that it is of a viscid or sticky character; it sticks around the nostil and has a tendency to stick the nostrils together; for, after the disease has been developed for some time, and is high up and affects the bone, there may be foetor, but not so fetid as in nasal gleet. But if

you have this discharge of a greenish-yellow color, extremely viscid and sticky, and which adheres around the nostril; contains large amount of albumen; will sink readily in water—but this may occur from other causes—it is sympathetic of glanders. The character of the discharge will vary, and it may be tinged with blood, and if so, it is symptomatic of an acute attack. The eye will sympathize with the disease, giving rise to a sort of purulent discharge about the inner canthus, not profuse, and it may not be present at all. But when you notice these, it is a significant symptom of glanders. But you will now see changes taking place in the mucous membrane of the nose. There will appear little elevations, tubercular deposits, which will change to cancerous ulcers, which may be irregular in shape, showing a sort of worm-eaten appearance, and these ulcers have no tendency to cicatrize or heal, although they may heal to a certain extent, but there remains a kind of white scar. These ulcerations may appear and run into each other, and the chamber becomes one ulcerated mass, and may completely eat through and destroy the septum nasi. I believe these ulcerations generally form well up, and may exist high up in the nasal chambers before they appear in the visible mucous membrane. There is another well marked sign by which you know glanders. It is the enlargement of the submaxillary lymphatic glands. They do not suppurate, but become indurated and adhere to the bone. This condition often makes its appearance just about the same time that the discharge from the nose takes place, and generally before you see the ulceration of the mucous membrane. There may be some difficulty in breathing, for I believe there are more or less changes in the lungs on account of tubercular deposits in the lungs. The animal falls off in condition, becomes emaciated, hide-bound; the skin seems to be attached to the flesh; gradually pines away, and dies a lingering death. If in the chronic form until these characteristic symptoms—ulceration of the mucous membrane, greenish-yellow discharge, indurated condition of the glands—are well developed, you may experience difficulty in coming to a correct conclusion. As well as tubercular deposits in the lungs, you may have them in the mesenteric glands. When emaciation is rapid, it may be a long time before these characteristic symptoms are developed. This was noticed in a certain stall in France, where glanders made its appearance. Close examination was made; those affected removed, and after some time more were affected, and removed, etc., and it was found to exist in some that had showed no visible signs. It was, perhaps, due to tubercular deposits in the lungs that gave it to others. There are certain diseases that might be mistaken for glanders. In nasal gleet there is a discharge from one or both nostrils, but it is not as sticky; there are no cancerous ulcers; the sub-maxillary lymphatic glands do not adhere to the bone, as in glanders.

Pathology or post mortem.—You find tubercular deposits in the lungs and respiratory tract in most cases. The glands become enlarged, and the afferent and efferent vessels also become enlarged, forming a sort of pedicle which attaches them to the subjacent tissue. The glands become more indurated and the cavities become filled up with a sort of pulpy deposition. There are generally tubercular deposits before ulceration takes place. Contagium is usually present in a fixed form, and is most virulent in the nasal discharge, but it is contained in the blood of a diseased animal, and this blood will produce it in a healthy animal if put in the flesh. The covering of the

muscles will produce it, the saliva, bile, and urine have produced it, and it is quite possible that it may be contained in all parts of the body. Its power varies, but is greatest in virulent cases, and some animals will withstand its effects. Some cases are related where it was brought on by glanderous tubercle from the lungs, where no other symptoms were noticed. Some authors think it is hereditary. We have a case mentioned where a glandered mare gave birth to a colt which died with glanders at about four and a half years old, without having been exposed to glanders. It is possible that a glandered mare might produce a colt that was free from glanders. The virus is not diminished in passing through many animals; but is increased in potency if taken from the human being. The virus will retain its vitality for some time, which shows the necessity of thoroughly cleansing infected apartments by the use of boiling water, carbolic acid, etc. The virus may be dried in the air and kept for a great while, and if rendered fluid by water is capable of producing glanders, so that a stable just swept out and left for months still contains the virus.

Treatment.—I will allude to it: giving plenty of pure air, good food, etc., will cause the symptoms to disappear to some extent, but it is best to destroy the animal in all cases. You may keep a healthy animal near an infected one for some time, and the former not get the disease unless there was contact in some way, but if a number are diseased in the same stable, the air becomes contaminated, and it might produce it. If you are called into a stable where three or four horses are supposed to be affected with nasal gleet, one or two affected in the first place and then others get it, then be careful in your examination. Nasal gleet is never of a contagious character. If you have suspicion of glanders, keep such an animal isolated, and have recourse to debilitating treatment, as a purgative, or take some of the discharge from the nose and put into some part of the body, as the hind leg of the same animal, or better, if you can get a worthless animal, inoculate it, and if it affects him then you may make up your mind that it is glanders.

Acute Glanders.—This is not quite so common here as it is in some other countries. This form may result from the chronic form, generally due to the virus being introduced into the system in some way or other. It developes quickly, and most authors say it is spontaneously generated. When the animal has been inoculated with the virus, the first symptoms will appear in four or five days, and will be extreme rigors, increased temperature, a discharge from one or both nostrils; chancrous ulcers in the nose, appearing far more quickly than in the chronic form, and they become confluent. The lungs are affected to a greater or less extent, and, in a great many cases, are severely affected with lobular inflammation, which frequently causes death. And I have noticed some cases where swelling of the limbs occurred, generally in one hind limb.

Post Mortem.—Appearances are the same as given in the chronic form; diffuse suppuration in the lungs, or a gangrenous condition of the lungs. A healthy animal may take it and die in from one to three weeks. Farcy exists with glanders, and is identical with glanders, although presenting different manifestations. Farcy is a term applied to many affections that are not really farcy, and could not be distinguished from it by a casual observer; one is called water farcy.

But when we say farcy, we mean a disease due to a specific blood poison, either generated within, or introduced into the system, and operating on the glands. It occurs in two forms, acute and chronic. It frequently terminates in glanders; and we find by experience that glanders will produce farcy, and farcy glanders. If the animal is not pretty severely affected, you may mistake it in the first stage; there is more or less fever, with a very well shown increase of temperature of the body; but these changes are not so significant to the casual observer. Little swellings appear in connection with the lymphatic glands, in one of the limbs, a hind limb generally. It looks like lymphangitis. The swelling takes place in the lymphatic glands. It may occur in the head and neck, or even in other parts of the body; and if upon the body, it may be taken for surfeit. These little enlargements change character to some extent; a discharge of aqueous character takes place; the openings do not heal as readily as ordinary sores, and they are called farcy buds. As well as this, you generally have, after the enlargements appear, little cords extending from the enlargements in various directions. These are designated farcy cords. A great many enlargements will appear, especially in the sub-maxillary glands and linguinal glands. They become enlarged, and run into each other more or less. The animal falls off in condition, presents a hide-bound appearance, etc. As well as these lymphatics being affected, a great part of the limb becomes swollen, presenting much the appearance of lymphangitis, unless the farcy buds are present. But in from two to six weeks we have symptoms which show the true character of the disease, and it may remain in this form for some time, and then acute farcy may set in. In other cases where you have the chronic form, it may remain in the same condition for some time, and all at once the joints will swell, perhaps the hock joint, then a discharge from the nose takes place; chancrous ulcers form, and it is speedily followed by glanders. The ulcers appear to heal to a certain extent, but if it is a true case of farcy, the healing process never takes place perfectly. Prof. Williams thinks cases have been cured. I have known it to remain in the same condition for a considerable length of time, and spread the disease to a considerable extent. I knew one treated for more than a year, and cause the death of four good horses. I never knew a case to recover. If it is due to a blood poison, it cannot be cured; but you may have somewhat similar conditions, not due to specific poison. In the acute form the symptoms are developed in a similar manner, but more violently. You may think it is lymphangitis; the temperature is increased; there is enlargement of the lymphatic glands and vessels, but it will not terminate in resolution, as it will in lymphangitis, but it terminates in suppuration. In the acute form it may extend over the body, upon the sheath, udder, etc., and the horse may have acute glanders following. Sulphate of copper, in external and internal applications, seems to improve the case, but I always recommend the animal's destruction. It is extremely deceptive, may recover apparently, but is never cured. If you only have suspicion of it, isolate the animal until you are sure of what is the matter. Although this is contagious, it is not so very contagious as some think; it is necessary to bring the animal into contact. Glanderous matter may be carried in various ways—in water, from animals drinking from the same pail, trough, etc.; and this matter may be given to an animal, and not produce the disease, and it was thought at one time that this would not produce it, but it is

now known that it will. Where it is necessary to examine an animal for glanders, be careful and do not get any of the matter in any sores, in the eye, mouth, nose, etc., as it might produce glanders; you may be able to examine by daylight, and it may be necessary to use an artificial light Bring it close to the nose, which will enable you to see farther up the nose. However, there is no great danger in handling a glandered horse, unless there are sores upon your hands; but if you make a post mortem, then be careful about cutting the hands, for it will produce glanders in man. Some such cases are on record. Although it is a disease common to the horse, it is said it has been conveyed to cattle, sheep, goats, lions, tigers, etc., they feeding on the flesh of horses that had died with glanders. But if it is cooked, it will not produce it, hence plenty of boiling water, carbolic acid, lime, etc., will destroy the virus. So, if you have an infected stable, cleanse the apartments thoroughly, and, perhaps, carbolic acid is just as good as anything you can use.

DISEASES OF THE EAR.

Injuries to the ear must be treated as injuries to the other parts. Just bring the parts together and secure the animal so he cannot rub. A tumor may appear in the ear of the horse, either in the external part or deep-seated in the meatus internus. An injury may produce it. In the first stages it does not interfere with the animal, but after some time it does. The horse will hold his head to one side or the other, and will shake the head when you do anything with him; and it may bring on cerebral derangement. I have seen some cases of such tumors where the animal would walk in a circular manner, showing cerebral disturbance. You can remove them with the scissors or knife, then cleanse the parts nicely and carefully. Use carbolic acid, sulphate of zinc, etc., and the cerebral disturbance, in many cases, will be removed.

Deafness.—If it is of a permanent character or of long-standing, nothing can be done for it. It is hard to detect, and you may meet with temporary defness, or partial deafness, from cannonading – from the intense noise.

Treat by a moderate dose of laxative, and bathe the parts well. If the cause is kept up for some time it may cause entire deafness. The animal appears stubborn, and cannot be taught to obey the word. The same things occur in cattle – tumors, etc.—and in cattle they may be of a tubercular character, especially if there is a tubercular tendency; but we oftener meet with this in dogs than in other animals. In dogs it is called

Canker, and is either external or internal, and involves the internal or external flap and the meatus. Canker is more likely to occur in those dogs used for sporting, from running through long grass, brush, etc., getting wet and then drying, which sets up irritation; and the manner of feeding the animal aggravates it – an over-abundance of animal food making him extremely fat, etc.

Symptoms.—More or less irritation; he moves the head from one side

to the other; scratches the ear; if you look at the ear you may find a discharge of an extremely fetid character.

Treatment is both local and constitutional. If from a well-marked cause, remove the cause; cleanse nicely and syringe with tepid water or carbolic acid—one part to twenty or twenty-five of water, or even stronger; or nitrate of silver in solution; or the tincture of the chloride of iron; keep him fixed in such a manner that he cannot shake the head, and if plethoric, give physic, syrup of buckthorn and jalap, or castor oil is very good. Aloes may be given, but it is not so good, as it has a tendency to irritate the rectum. Iodide of potassium is also good. If the ear becomes gangrenous, you may have to remove a part of it, and you may have abscesses from some causes; they are generally serous. Make an incision, and then use some of the remedies given. Restrict the diet to a certain extent. Give some exercise. We sometimes meet with fistula at the root of the ear. This is more common in horses, and is generally congenital, or from malformation. It is easily detected by close examination, but it might be overlooked. But you can notice a little matter at the root of the ear, and a small opening, which is a fistulous opening, and passes well in at the root of the ear, and is often of long-standing. The skin may be reflected in and covered with the ear. Exercise the parts and cut this fistulous wound out. It may not set up much irritation, but must generally be dissected out, or you may inject with caustics, and afterward dress with a mild caustic, as nitrate of silver, chloride of antimony, tincture of the chloride of iron; and you may have tooth-deposits—tooth substances have been formed at the root of the ear and caused fistula; in such cases you find enlargement to some extent. It is possible that tooth-substances may be found in the testicle. There is scarcely a tissue where a tooth-substance may not be found.

DISEASE.

It is difficult to give a definition of either disease or health. They are closely united, and it is difficult to draw the line of demarcation. First I ask, what is disease? We may consider it to consist of a deterioration from a healthy standard, either of function or structure; or we may say it is just the opposite of health, or a disturbance of the function or structure of a healthy organism. Health is a condition of the animal body in which all the organs are in good condition, and all the functions are performed in good order; and it is difficult to get a body in perfect health. There is generally some little deterioration of structure or function. You may look at a horse; he does work in a regular manner, and he is considered healthy, but there may be some change in some way, so that it is quite difficult to give a precise definition. There is health where all the organs are intact, and each one capable of discharging its respective duty or function. From health to disease there are certain transitions noticed. If animals are kept in their natural state they are free from disease to a certain extent, but when they become domesticated, then a change takes place in the system. They do not receive a regular supply of pure air, pure water, regular exercise,

etc.; then this change takes place to a certain extent. All these things must be attended to in order to keep either animals or men in good health. We meet with various terms in the study of disease, as

Pathology, which is derived from two Greek words, and means a discourse on disease, or the doctrine of disease, and includes all the various particulars in connection with disease. Pathology may be divided into two divisions, general and special. General pathology considers disease in common, the various branches, causes, symptoms, etc., while special considers each disease in particular. In all diseases there are certain changes that take place in connection with them. It is a very important branch of study.

Etiology, or the causes of disease. This is also important. It may be arranged under different heads; there are predisposing and exciting causes. There is almost always a cause for every disease, but it is sometimes difficult to tell just what the cause is. If you can find and remove the cause, the case is, as a general thing, easily treated. Etiology, though plain in some cases, is obscure in others. A disease breaking out and spreading over a large territory is an epizootic disease; and it is difficult to say what is the exact or exciting cause. Another important branch of pathology is the symptoms, or

Symptomatology, or study of the symptoms of disease; or the means by which disease is recognized from the symptoms presented by the organ or organs diseased. The symptoms may be general or local. There are in the limbs certain local symptoms, but the cause may be such that it will produce general symptoms. It is further divided into primary and premonitory. In laminitis, we sometimes notice the horse exhibiting premonitory symptoms, and, after some time, well marked symptoms. There are general symptoms, as rigors, shivering in fever; and in certain organs we have symptoms of those organs having undergone certain changes.

Diagnostic Symptoms are those by which we are able to detect the character of the disease, and the parts diseased. It is the discrimination of disease. There are diagnostic, prognostic, and pathognostic symptoms. There may be a collection of symptoms, and may be characteristic, as in glanders. There is a discharge from the nose. This may be symptomatic of several diseases. But if there is a discharge and ulceration of the mucous membrane, the sub-maxillary glands are enlarged, and attached to the adjacent tissue, etc., then we have characteristic or pathognomic symptoms of glanders.

Prognosis, or telling the probable termination of a disease. You examine the symptoms carefully, and make up your mind what is the matter, and then tell the future of the disease, either favorable or unfavorable.

Therapeutics, that branch of medicine which has reference to the treatment of diseases. Diseases are classified under different names, according to progress and character of disease. There are epizootic, enzootic, specific, sporadic and zymotic; these are the ordinary classification or heads.

Epizootic is derived from two Greek words, signifying on and animal. In human practice it is epidemic. A great many animals become similarly affected at the same time, without any appreciable cause. A common example is that known as epizootic, catarrhal fever and influenza. It may be due to atmospheric influence, either contagious or non-contagious. In cattle a good example is epizootic aphthae.

Enzootic diseases are confined to certain localities, and are due to local influences. They may become contagious after leaving that certain place. Rinderpest is a good example, but has never been known on this continent. It is in Russia. Texas fever appears common to certain localities of Texas, but it is set up among the northern cattle. It may be generated from the character of the water, food, grass, soil, etc. In man, the term indemic is applied, as the ague.

Specific, peculiar to particular class of animal, the virus of which, if introduced into another animal, may produce the same disease as glanders, strangles, distemper in dog days, etc., but a specific disease is not necessarily contagious.

Sporadic is a word derived from a Greek word, meaning to sow here and there. It is from accidental causes. Most diseases come under this head, and are from well-marked causes.

Zymotic.—Some of the diseases mentioned are of a zymotic character. Zymotic means a ferment. It acts like a ferment in the blood. Investigations show that by minute bodies, so small that you can scarcely think of their minuteness, an action is set up in the blood, perhaps in the form of a ferment. We find that most diseases consist in some change in the blood itself, or in the flues which nourish and renew the tissues; but a majority consist in a change in the blood itself. In a living body there is a continual change taking place, and the great characteristics of these changes are the processes of decay and reparation, which only terminate at death. Substances pass into the body and are carried to all parts of the body. Waste is taken up in the blood and carried from the body. The body wastes during the day, and during repose it is nourished and the waste repaired. The human being, during one year, loses three thousand pounds by waste of tissue, and the repair equals the waste. However, in youth the repair exceeds the waste, so that the animal gradually grows. In the adult they are just about equal, provided there is a certain amount of exercise. In old age the waste is in excess, and the animal becomes smaller. In disease something takes place, equilibrium is upset, and there is a change of function or structure. We often see this taking place. An animal is attacked by disease and reduced quite quickly—the result of this poison in the system. Life is maintained in the body by the circulation of pure or arterial blood through the system. This blood is the great fluid of the body; whenever arterial blood ceases to circulate, death is the result; or, if it circulates, but becomes impure, there follows a similar result. If the blood becomes changed but slightly, it produces disease very quickly; and if changed to any great extent, it produces death very quickly. Life is an aggregate of the functions which resist death, and is maintained by the blood. Death is the cessation of all the functions, the aggregate of which constitutes life. Now death may occur in different ways, and sometimes it is immaterial how an animal died, but at other times we are called to tell how he died. If no blood circulates, death takes place from syncope, from a want of a due supply of blood to the heart, and the heart loses its power. Bleeding causes death from syncope, or from necræmia. The heart loses its power from want of its natural stimulus—the blood. Death from syncope may occur in other ways: the heart may lose its contractile power from a blow over the heart or stomach, or from poisons, or from fright, or from derangement of the nervous system.

Asphyxia, or Apnœa; access of air to the lungs is prevented, as in drowning, hanging, choking, and sometimes from tetanus; again, from coma. Death from coma begins in the brain—frequently from medicines. The symptoms are drowsiness or comatose condition.

BLOOD.

Blood is the great and important fluid of the body, and is carried through the system by means of a set of vessels; they are arteries, capillaries and veins. The heart is the great center of the circulation. It is situated in the thoracic cavity, and acts as a force pump to send the blood through the system; but there is a power in the vessels of drawing blood to them to a certain extent, somewhat as the sap is drawn up in the tree. The arteries are vessels that convey blood from the heart to various parts of the body. They are so named from the former supposition that they contained only air, as they were always found empty after death. They differ, also, in structure from the veins, and do not collapse as the veins do. They possess contractility and elasticity, and their power of contraction is due to muscular tissue in their walls, which consists of contractile fibre, cells, which have the power of diminishing the caliber of the artery in which they are situated, and can either arrest partially or completely the flow of blood. The large vessels are especially elastic; they have both muscular and yellow elastic tissue. They convey the blood to all the tissues of the body, and when it has fulfilled its function, it is brought back to the heart by the veins. The

Veins are the vessels which bring the blood to the heart. They have thinner walls than the arteries, and have valves, which valves are foldings of the inner lining of the vein. These valves do not exist in the pulmonary vein. They tend to help the blood towards the heart. When the veins are empty they collapse. Between the arteries and veins we have very small vessels, which form the connecting medium, and are called

Capillaries, which are formed from the breaking down of the arteries, and form the veins on the other side. They are very delicate and minute, and during health the blood circulates through all these in a regular manner, and the liquid portions of the blood continually exudes to supply the various tissues, and at the same time they are excreting waste tissue, and it is in the capillaries that nutrition is primarily effected. There are also lymphatic vessels, which take up this waste, but the blood vessels also take it up, to some extent. All the tissues of the body, whether bone, muscle, hair, etc., are nourished by the blood. Blood is the fluid contained in the heart, arteries, capillaries and veins, and is formed chiefly from the chyle, and when first drawn from the body it has the appearance of a homogeneous fluid. You would think it composed of but one thing, but after a while it loses this appearance. It has a saline taste. The halitu is a smell, or faint odor, which arises from a watery vapor, from freshly drawn blood, and is characteristic of the animal from which it was drawn. The temperature of the blood is 98° to 100°. Blood is of a red color, viewed as a whole, and is a fluid, but not a perfect fluid. It is com-

posed of a fluid portion, the liquor sanguinis and a solid portion, corpuscles, or blood cells. The corpuscles are of two kinds, the red and the white; the red being the more numerous, the average being about 250 red to 1 white, but they vary both in health and disease. These corpuscles float in the liquor sanguinis. These corpuscles are very important. They are said to possess vital properties; are said to assimulate material from the blood, which is called globuline, and haematine. They assimulate material for the right composition of the blood. The red corpuscles give color to the blood. In warm-blooded animals, the white corpuscles are the larger of the two, and are rather irregular in outline, and are found to change their form to a great extent. The red corpuscles also change during disease. If they do not receive a sufficient supply of water they become dried up, to some extent; the capillaries are differently arranged in different tissues, as in the mucous membrane, the skin, the villi of the intestines, air cells (where interchange of gases takes place), parotid gland, etc.. I will give you an outline of the blood, but different authors give it differently:

Water	785.0
Albumen	69.0
Fibrin	3.0
Alkaline and Neutral Salts	8.5
Fatty and extractive matters	7.5
Corpuscles	127.0

Albumen, fibrine and salts in solution form the liquor sanguinis.

Liquor sanguinis 873, corpuscles 127 parts in 1000.

Alkaline and neutral salts: Chloride of sodium, chloride of potassium, phosphate of soda, carbonate of soda, phosphate of magnesia, phosphate of lime, phosphate of iron, oxide of iron.

There is a large amount of water that gives blood its fluidity. If the water is drawn off by evaporation, there is a solid left, which is of no use for nutrition. There is intense suffering from thirst on this account. Albumen is a remarkable ingredient of the blood. The white of an egg is a good example of albumen. Albumen is the original pabulum from which all the tissues of the blood are formed; it holds the salts in solution. Some say there is no fibrin in circulating blood, but we will suppose that it does exist, and is the property of coagulation. Other constituents are chloride of sodium, potassium, etc. Animals remote from the sea must have a regular supply of salt, which is an ingredient of the blood. The matters of the blood are liable to changes to a certain extent. The amount of blood is about one-eighth to one-tenth the weight of the animal; but a much less amount than that, drawn, will produce death. There is depletion of the blood in old animals; if drawn it is not so readily regained as in young animals. The color varies between arterial and venous blood; in the arteries it is a bright red color, and is fit for the building up of tissues. The blood is carried to the lungs, and carbonic acid passes from it, and it is turned from a dark color to a light red by absorbing oxygen. After being drawn for a short time it resolves into two parts, the clot, or crassamentum, and the serum. This is the natural result, and does not show inflammation. The serum is almost colorless. We give chloride of potash in purpura, for if fibrin is not present then the blood will exude, and chloride of potash assists coagulation. A solution of soda will prevent coagulation. This gives us a clue to the treatment of disease by exerting a certain influence on the blood. Blood kept at a low temperature will not

coagulate so readily as if warmer. Heating blood coagulates it, from the albumen it contains. Blood receives matter from three sources, from digestion in the alimentary canal, from tissues which have served their purpose, and from the atmosphere through the lungs. Oxygen acts upon the system to a great extent. It is said to act on the various tissues when the body dies, destroying all the tissues except the bones; although such body is not molested by dogs or other animals, and either left upon the ground or buried, some of the materials go into the ground, others into the atmosphere, etc., and pass from one to another; and some man at the present day may have some of the identical brain of Julius Cæsar.

Recapitulation of Blood.—The fibrine of the blood is destroyed and reproduced three times in twenty-four hours. So fibrine is a very important substance, for by it we are enabled to control hemorrhage. If rupture of a blood vessel takes place and there is a lack of fibrine or its constituents, it is very hard to arrest hemorrhage; but if a small vessel is ruptured and the constituents of fibrine are present, you can easily arrest the flow by pressure, for a coaglum is formed and you have healing by the first intention. The fibrine may be increased or decreased under certain circumstances. In laminitis we use soda, for there is an increase of fibrine. If you bleed a horse from the jugular vein, and allow the blood to flow freely into a can, after it settles in the can there is a peculiar white coat upon the surface, which is called buff. In the horse it is no evidence of inflammatory action, but it is due to the manner in which the blood coagulates; the white corpuscles being on the top, the red lower down. And the depression on the top of the blood is not due to any change in the condition of the blood. I think you cannot tell by looking at blood what is the matter with the animal. However, in lung disease, the blood is darker than usual, owing to the congested state of the lungs.

INFLAMMATION.

Inflammation may be said to be an alteration in the healthy structure or function of a part, accompanied by a perverted condition of the blood in the capillaries, all of which may be due to a certain amount of paralysis of the vital principle of the tissues inflamed. From the earliest ages this subject has excited the interest of the medical inquirer, and treatment of disease was in accordance with the opinions held with regard to this process. We will notice some of the views that were held regarding the process. It was supposed to be an exalted action and increased nutrition to the parts, and the antiphlogistic treatment was recommended. It was supposed to be too much blood to the parts, and if it could be gotten rid of, it would cure the disease; but this has been found to be different, and different opinions are still held. We hear much talk about the vital principle, and it is difficult to tell just what this principle is. It was supposed to exist in certain tissues, as in the brain and nervous tissues; others tried to demonstrate that it existed in the blood; others that it existed in the nervous system without blood being the seat of it. But it is

now believed that every tissue possesses this vital principle, or property. The cells of every tissue extract from the blood nutritive properties necessary for their growth—muscular tissue, properties for it development, growth, etc. Changes of view regarding this vital principle have led to great changes in the treatment of inflammation. It is difficult to give a concise definition. It is not the blood alone that is affected, but the tissues are also affected. I will give some other definitions: It is an exudation of liquor sanguinis, but when there is an exudation of liquor sanguinis there is not always inflammation, and a mere determination of blood to a part is not inflammation, but congestion. It is defined as a peculiar perversion of nutrition or secretion. Inflammation may be present, and not have all these conditions. Irritation appears to be the starting point of inflammation. Inflammation may be said to be a destructive process, or a fermentative process, and is sometimes just what we desire to set up for the healthy maintenance of parts. A part, to be in a state of health, must have a regular and not far distant supply of blood, and the right composition of that blood, and the influence of nervous force in a natural state. In the process of inflammation there is more or less change. This process can be easily seen in some transparent vascular structures, such as the web of a frog's foot. If this is put under the microscope, the blood will flow through in a regular manner, the red corpuscles most abundant and occupying the center of the stream move quickly, and are surrounded by the liquor sanguinis. There are some white corpuscles also. They are larger and change their shape, accommodating themselves to the vessels through which they pass. If an irritant is applied to a part, and the part excited to an inflammatory process, a marked change takes place. The vessels contract, and consequently there is a diminution in the amount of blood. By and by the vessels become dilated, and quickly regain their natural size. If the stimulant is but slight when they are dilated, blood will flow a little quicker for a short time, but if the irritation is increased or continued, and of a severe character, the muscular walls appear paralyzed, and do not contract, but dilate much above their usual state, and let more blood into the capillaries, the circulation becomes slower and slower, there is an increase of blood to the parts, a clear margin of the liquor sanguinis, the blood becomes almost stagnant, the corpuscles alter and adhere to the sides of the vessels, exudation takes place through the walls of the vessels, and gives rise to what is sometimes called leucocythæmia. Inflammation is established, the blood rushes in and changes to a certain extent—becomes somewhat muddy, so to speak—the vessels may rupture and the blood goes through. Previous to inflammation actually taking place, there is hyperæmia or congestion. There must be an altered condition of the blood in the capillaries. It is difficult to say just when congestion ceases and inflammation begins. Inflammation does not terminate so quickly as congestion. Congestion is an excess of blood in the parts. There are various kinds of congestion. If there is too much blood in some parts, it is local congestion, or partial plethora. We see this without there being any disease. Congestion can be caused in various ways, and very easily, indeed. There is always more or less congestion in the lungs in severe exertion. It can be induced by means of the nervous system—as in anger, one person's face will get red, and another's will get pale—or in the blush of a young lady; or this is sometimes seen in a bashful young man, as in Mr. ———, and see how quickly it

takes place. It is done by means of the nervous system. If we irritate a part mechanically, we give rise to active congestion. It may end in hemorrhage, or pass on to inflammation. It is difficult to say whether it will pass into inflammation or not, especially in the lungs.

Signs of Inflammation.—The visible signs are heat, pain, redness and swelling. But inflammation may go on to a great extent, and the tissues be considerably destroyed, without all these taking place. These are signs by which it has been recognized for hundreds of years. In man, the sign first noticed, often, is

Redness, but it is not so in domestic animals, as the skin is covered with hair. Redness depends upon the amount of blood sent to the parts, and it varies in different places, and according to the causes. If a horse receives an injury in the eye, the mucous membrane is very much reddened; and in scratches, redness is seen, especially if in a white leg. In acute inflammation, the parts are of a florid color, and it takes place quickly; if in the bowels, gangrene may take place quickly, due to changes which go on in the parts. The

Heat is due to the amount of blood, and the changes being undergone. If the tissues of the body are being broken up in any way, an effort is made to take them from the system, and this produces heat. The heat of a part is, however, not so much above the natural temperature as you would suppose. In inflammation of the hock joint, or foot, when you apply the hand, you would suppose there was an increase of many degrees, but it is not so much as you would think. In inflammation it would run up to 102° or 104°, so it varies from 98° to 104°. The increase is greater remote from the heart, as the natural temperature of those parts is several degrees below that of the blood at the heart. We find this increase in the hock and foot. The temperature is sometimes higher in influenza than in enteritis, so it is due in many cases to the change taking place.

Swelling is due to exudation and effusion into the tissues; first, engorgement of the vessels, which is followed by exudation through the walls into the surrounding tissues. In some tissues swelling is a very evident sign. It takes place quickly and to a great extent, and, no doubt, in some tissues affords relief. In many cases it must not be looked upon with any great degree of alarm; in lymphangitis it is not a very dangerous sign. But if in other parts, as the mucous membrane of the respiratory organs, it is more alarming, and may produce death very suddenly, by interfering with respiration. And, although this is one of the recognized signs of inflammation, it will occur from other causes, as the peculiar swelling of purpura, which is not due to extravasation of blood, and not to inflammation. We find it also in tubercular swellings, and rupture of the capillaries.

Pain is another sign. This varies much in different structures; in some being most excruciating—in laminitis, for example. Here we have an extremely vascular and sensitive structure, and the tissues being covered with a hard, resisting hoof, makes it more painful. In inflammation of articulations it is the same—a slight puncture in the region of or in the joint, from the action of the air and escape of synovia. The same is found in rheumatism. Athough pain is often the sign of the inflammation, you may have inflammation go on to a considerable extent without any great degree of pain being manifested. We see this in horses and cattle, and I believe in man,

from irritation of the lungs. If in a horse, he is dull, dumpish, as it is called, in doing work. But by and by the appetite is gone, etc., a surgeon is called, and even hepatization may have taken place. Pain is due to the distention of the blood vessels pressing on and affecting the nerves. Tissues that do not appear to possess any degree of sensibility in health will be very painful in inflammation—bone, for instance. In this the pain is most excruciating. In the mucous membrane of the bowels and respiratory organs, pain is not so intense; it is a dull uneasiness, and there may be great pain without much inflammation, as in spavin; and in spasmodic colic, the animal often suffers as much as in enteritis; but it is, however, a sign of inflammation. If a part has been in a state of inflammation, it must have a termination or result.

Terminations of inflammation are resolution, adhesion, effusion suppuration, ulceration, and mortification or gangrene. Adhesion and effusion are sometimes not given as results. Resolution is the most favorable; for instance, if a part has been under the inflammatory process, this process is arrested, and the parts restored to their natural condition, then we say it terminated in resolution, which, in most cases, is most desirable. Nutrition and function may be restored to their natural condition, but there may be a slight change in the structure, but so slight that it cannot be noticed, and it is resolution. A form of resolution is delitescence, that in which the inflammation subsides before the exudation solidifies, and the products are taken up by the vessels and got rid of. We often see this in our patients. After fomenting the parts, the inflammation subsides, and the products are taken up by absorption; but if it coagulates or solidifies, then the process is different and more tedious. It breaks up by a kind of fatty degeneration, and becomes mixed with the surrounding fluids, and separates into various compounds, and is got rid of by way of the circulation, through the various excretory organs. It is in this way that some of the enlargements in the system are got rid of. We set up an inflammatory action by irritation, and the results of the old inflammation are broken up, and so got rid of.

Adhesion—When the two surfaces are brought together, and healing takes place. In our patients many wounds heal by adhesion. We find this in injuries in certain parts, where the exudation, instead of breaking up, is converted into an organized body, and remains during the life of the animal, to a more or less extent. We find this in sprain of the fetlock joint. It becomes inflamed, the animal is moved around, which keeps up the inflammatory process; vessels and nerves pass in, and a new structure is formed. But we find this may become denser to a certain extent, and the enlargement becomes smaller and smaller. It is a case of adhesion. When you have such a case, just think of the inflammatory process, and do not give exercise. Exercise may reduce the pain for the time being, but after resting it will increase. It is, to say the least, absurd; but keep quiet, and allay the

Effusion.—There is fibrine or its constituents, but it does not coagulate until exposed to the atmosphere, as in pleurisy. There is more or less effusion of serum; and fibrinous threads are also seen. We have it in connection with injuries, as a kick in the region of the loins, or a bruise on the shoulder. When you examine it, you find it contains fluid—blood and water—not pus; this is an example of effusion. It comes from a slight injury to the areolar tissue, no doubt.

Suppuration, or the Formation of Pus. — Pus presents two parts for consideration, a liquid and a solid; the corpuscles being the solid. It may take place in different ways, or in different forms— circumscribed, diffused and superficial.

Circumscribed, as an abscess, or from injuries to the shoulders or muscles. Pus is formed from blood cells, and is known as a yellowish white fluid, ordinarily inodorous, but in fistula, etc., it becomes fetid.

Diffuse Suppuration, as in glanders and injuries to the large muscles, as in the gluteal region.

Superficial, as in the mucous membranes. Some mucous membranes do not form much pus, while others do; examples of the latter are those of the nose and generative organs. There are inflammatory tumors, as in strangles; they are at first hard, then soft, then burst. This is circumscribed suppuration. It breaks down the tissues and finds its way to the outside, or pus may remain for some time in the tissues, as in abscesses in cattle. It may remain much the same for a considerable length of time, but if punctured deep pus may be found. Suppuration is sometimes favorable, as in a case of injury from a nail in the foot, matter forms and escapes and relief is afforded. When blood or its coloring matter is mixed with pus it is called sanious pus. If pus is continued for some time in connection with a diseased bone or tooth, it becomes very fetid in many cases. Pus is sometimes found with active properties. It flows from a wound over the skin, it destroys the hair or skin, and is called ichorous pus. If pus is mixed with poison, as that of glanders, etc., it is called specific pus, for it will produce the same disease. Laudable pus has no smell. Diffuse suppuration may occur in some internal organ, as the lungs, and is called purulent infiltration. In injuries to the groin or withers, if there is danger of erysipelatous inflammation, or danger of it running on to gangrene, diffuse suppuration is sometimes desirable. It is superficial when in the skin or mucous membranes.

Ulceration.—This may be called molecular death of a part, and generally arises when the tissues degenerate and are thrown off in large amounts. There are different kinds of ulcers. Some will heal readily, while others will not. The ulcers of glanders will not heal. Ulceration is frequently produced by continued inflammatory action. When the vitality of a part is greatly depressed, or the general powers of the constitution are weakened, ulceration is likely to take place, the state of the system tending to help it.

Gangrene, or Mortification, is death of a part, either in its entirety or a portion of greater or less size, and may proceed from direct injury to a part, and is the result of intense inflammation. When it involves any important organ, or is extensive, it creates great constitutional disturbance, acting upon the heart. The pulse becomes weak and indistinct, ending in death, and a large portion of the bowels may be found in a gangrened condition. But if it affects but a small part, there is not so much constitutional disturbance. Even a small part of the lungs may become so, and the animal live for some time. If a part dies from gangrene, it acts as a foreign body to the tissues surrounding it, and, like all foreign bodies, sets up an irritation in the surrounding tissues, which continues, and the surrounding tissues are converted into pus, and the dead part is so removed from the body. We frequently assist nature in this by assisting the sloughing process. There are acute, sub-acute and chronic forms. That which runs its

course quickly is called acute, and it may run on and prove fatal as soon as twenty-four hours. The chronic form may remain in much the same state for some time. Then there are local and specific. Local inflammatory action in the feet, as laminitis, or inflammation of the hock joint, and from punctures. Specific inflammation contains a poison or virus. There are also other terms, as sthenic and asthenic. Sthenic means strength; asthenic, want of strength. The first can only occur in an animal in healthy condition; in such an animal as is working from day to day, the various organs acting in a healthy manner, etc. The asthenic may be generated in an animal in vigorous condition.

Signs of Inflammation.—Either in local or diffuse there is generally more or less fever, which is well marked in many cases. The pulse increased, and there is fever before we have the well marked symptoms of inflammation. In pleuro-pneumonia, in cattle especially, a thermometer is of great use, as the increase of temperature can be detected some time before the other symptoms. In diseases of the respiratory organs, there is generally irritability, or the patient is irritable, or dull and drowsy.

Rigors or Shivering.—This is significant of congestion, and may last for some time, even a day or two, before the inflammatory action is noticed. When rigors are noticed, the animal should be noticed for some time. An animal may shiver from drinking cold water; but this is different from the rigors produced by disease. Rigors, in some cases, are very severe, especially in lung disease, and also diseases of the bowels, due to changes in the system; the digestive system is generally more or less affected. In all inflammation, no difference where it occurs (but there are exceptional cases), the bowels are costive, the feces pass in hard pellets, etc. This may be noticed in a puncture of the foot to a certain extent. The secretions are more or less affected; the kidneys do not act in a natural manner; they give off more solid matter than in a healthy state.

Circulation.—By this we can form some idea of the character of the inflammation. This we call the pulse, which is very important in the detection of inflammation and disease generally. This is produced by a wave of blood sent by the contraction of the heart, and the nearer the heart the stronger the pulsation. The pulse in the horse, as in other animals, is of great importance; it tells the number and force of the heart beats. You can take the pulse in any superficial artery, but the sub-maxillary is perhaps the best, as it is only covered by the skin; or the radial artery, in case the horse keeps moving the head; it is just inside the fore-leg. Endeavor to keep the animal as quiet as possible, for if you excite him, you will find the pulse increase several beats, and after standing some time it will again fall. Place the finger transversely across the artery, and you should have some idea of the natural pulsation. It varies in different animals; slower in heavier horses, quicker in highly nervous animals. It may vary five or ten beats per minute, and the animal still be in perfect health. It runs from 25 to 40. In cattle it is some quicker. You should take the pulse in healthy animals and become familiar with it. There are various kinds of pulsations, as the results of certain diseases—the quick, slow, large, hard, soft, frequent and infrequent. The strong, full pulse may be present, and consistent with good health; exercise will change the pulse to considerable extent. But if the animal is suffering from disease, and then the pulse is of a wiry character, it is

characteristic of the sthenic type of inflammation. Suppose an animal has been standing in the stable, and is attacked with lymphangitis, the pulse is of a full, bounding, wiry character. A wiry and thready pulse is characteristic of inflammation of serous membranes, punctures of the feet, inflammation of the joints, etc. The weak, small pulse is indicative of debility, showing inflammation of an asthenic type. It may occur in influenza and catarrh. The oppressed pulse is characteristic of congestion and inflammation of the lungs; you would think the heart had great difficulty in propelling the blood forward. The throbbing pulse is characteristic of inflammation in certain parts. In laminitis there is, perhaps, the best example of the throbbing pulse, beating quickly, with a peculiar throbbing sensation, especially in any inflammatory action in the vascular structures of the feet, making the circulation difficult. A slow pulse is characteristic of cerebral disease, but if only twenty-eight or thirty, you must not say at once it is cerebral disease, but if it is accompanied by a comatose condition, then it is indicative of this disease. The intermitting pulse is found where the animal has suffered from some debilitating disease, as influenza, strangles, catarrh, etc. Although it must in some cases be looked upon with suspicion, it is not generally very alarming, but if there is a change for the worse, and this pulse, it is unfavorable. The fluttering and almost imperceptible pulse, indicates great changes in the system, as in the latter stages of enteritis, pleurisy, pneumonia, etc., especially in interitis; if a case where the pulse is 40, 50 or 60 per minute, and changes, and runs up to 80 or 100, and become indistinct, it is indicative of approaching dissolution. These are the varieties of pulse, and due to the manner in which inflammation attacks the various parts. The pulse varies from 25 to 125. You may meet with a case at 125 where it may recover, but higher than this will no doubt prove fatal.

General Treatment of Inflammation.—The aim should be to diminish the inflammatory action, or if exudation has taken place, to further its removal; endeavor to find and remove the cause, for without removing the exciting cause, treatment would be of but little value, as in case of a nail in the foot, or from any irritant being lodged in the muscles of the body, or in conjunctivitis and ophthalmia. Keeping the animal quiet and keeping the inflamed part in a state of rest, also materially assists your treatment. Put the animal in a clean, well ventilated box, attend to the diet, give easily digested food, plenty of cold water, etc. These are valuable adjuncts. Solicit the action of the bowels by injections or laxatives, as the case demands.

Medicinal Remedies may be either local or constitutional—constitutional given internally, the local applied to the part affected. The constitutional acts upon the whole system, and also upon the parts affected. Blood-letting was at one time regarded as the great sheet-anchor of treating inflammation. Bleeding was performed for everything and for nothing. They bled periodically, whether sick or well. The question was once asked a person who was bleeding an apparently healthy animal, "What did you bleed him for?" "For a shilling, sir," was the answer. But we meet with some cases where it is attended with benefit, as in a vigorous animal, and should not be altogether discarded. But sedative remedies would prove fatal in many cases. The reason why blood-letting was resorted to, was looking upon inflammation as too great a determination of blood to a part, and by taking that away a cure would be effected. But you may bleed an

animal almost to death, and still not relieve the inflammation. Bloodletting may be local or general. The local is sometimes a benefit, as in a swollen eyelid in human practice. And to do any good it should be drawn quickly and from a large vein—the fleam being the safest way, and the jugular vein being that usually chosen. The amount that should be taken is hard to say, but watch the effect, and if the pulse alters in any way, then stop the flow. Cold applications are useful, and are used extensively in local inflammatory action, and at certain seasons of the year are preferable to warm. They act by contracting the vessels, and, if judiciously applied, are of benefit. But you must apply them with care, for I believe too much ice, or ice applied too long, may do more harm than good. I believe they will prevent exudation to a certain extent. Applying cold water from the hose is sometimes of benefit, but it must be applied for some time to be of use. Hot applications are beneficial, and sometimes preferable to cold. If there is severe pain, then apply warm water, which acts by causing increased debilitation of the vessels, and soothing the parts. Hot water is an excellent fomentation, or you may use medication, or use blankets warmed by the fire. Either hot or cold applications, to be of benefit, must be kept up for some time, and there is difficulty in this, as we order so and so done and it is not done. Purgatives are useful in inflammation—the best being aloes for the horse, sulphate of magnesia for the cow, and syrup of buckthorn and jalap for the dog. They relieve by moving the bowels, and also some fluid portions of the blood. They produce irritation and increased peristaltic actions of the bowels. Although there is great benefit from purgatives in some diseases, such as laminitis, constipated state of the bowels, in some others they must be used with great caution, as in inflammation of the lungs. Aloes is generally best given in the solid form, as, if in a fluid, some is lost. Sedatives are useful in the treatment of inflammation, and act by means of the nervous system. These are aconite (perhaps the best), digitalis, belladonna, calomel and tartar emetic. Diuretics are extensively used, more by us, perhaps, than in human practice. Human practitioners can act upon the skin, but we can not to the same extent; but we can act upon the urinary organs. The best diuretics are nuetral and alkaline salts, nitrate of potash, etc. There is an increased amount of fibrine, and these tend to counteract this condition. Opium is another valuable remedy in certain inflammations—the great sheet-anchor, so to speak, if there is violent pain—or morphia, given hypodermically. Give cold water; it tends to improve the condition of the blood, especially in pneumonia, congestion of the lungs, etc. Give cold water frequently. It is one of the essential ingredients of the blood, and it is a great mistake to limit the supply.

Osseous—The diseases of the osseous structures. These hard structures are liable to the inflammatory process, the same as the soft structures, and, according to the character of the inflammation, certain names are applied. Bone is composed of two tissues—the compact and cancellated, covered by a vascular, white, febrous, highly nervous membrane, called the periosteum. If inflammation attacks the internal part of a bone, it is likely to involve the periosteum, and if it attacks the periosteum, it is likely to involve the bone.

Ostitis—Inflammation of bone in the horse. This is generally found the result of either direct or indirect injury, but sometimes of a

constitutional tendency. It may begin either in the compact or cancellated tissue. The first effect is to increase the size of the haversion canals, which become more irregular in size and outline, and the union between the earthy salts and the vascular net-work in which they are contained is lessened, and the salts are partially removed and the place taken by the products of inflammation. Then there is a cancellated tissue, and it enlarges to a certain extent, and when the inflammatory action begins in it this is always the case. The inflammation may come in the cancellated tissue and involve the compact and destroy the laminal layer. This destroys the articular cartilage, then the cancellated tissues come in contact. Nature endeavors to overcome this by throwing out a deposit, and the joint becomes one bone. If the inflammatory action results from some constitutional cause, it is scrofulous or rheumatic ostitis, which is more likely to appear in colts. This inflammation may also have different terminations and names. Resolution may be a termination; or, if the inflammatory action is kept up, an abscess may result—and an abscess of the bone is difficult to detect in our patients. If there is but a small amount of pus, it is usually relieved by cutting open the parts, trephining, etc. An injury may produce an abscess. The horse suffers intensly from inflammation of the bone; the periosteum is very likely to become affected, periostitis and ostitis frequently being associated; an exudation is often thrown out between the periosteum and the bone, as in splint, sore shins, etc., just from inflammation of the periosteum. Periostitis is more likely to occur in those bones that stand upright, and is due to concussion. These are the products of inflammation of the bone. If ossific matter is thrown out it is called *exotosis*, meaning bony deposit, and is produced by more or less inflammatory action. A very slight action is sufficient, sometimes, to produce it. It may occur without the horse suffering from irritation. This is sometimes spongy, and sometimes hard and dense. A common exostosis is spavin, and it is analagous to the structure of bone, from which it sprung. It is in our patients generally the result of injury. Splint is perhaps a better example of exostosis than spavin.

Caries is analagous to ulceration in the soft tissues—death of bone in small particles. It is decay of bone, the result of inflammatory action. It is molecular death of a part. Caries is more common in some bones than others. In spavin, where the animal has been lame for some time, the bone presents a carious condition; also in ringbone, navicular disease, etc. It seldom in such cases affects the soft tissues to any great extent, and is called dry caries. The laminal layer undergoes absorption and ulceration, and the articular cartilage is destroyed, and is never renewed. Inflammation is set up in the bone from some cause or other; nutrition is interfered with; a change takes place between the vascular elements, and the salts are removed to a certain extent, and there appears a small spot upon the articular surface. If it attacks other parts, as from injury to facial bones, or in connection with the atlas, withers, etc., then it is somewhat different; matter is formed and cannot escape, and it burrows down and sets up irritation in the periosteum and bone, and so produces caries of the bone. If there is a discharge, and it continues for some time, it is generally fetid. There may be caries of the lower jaw, which may be caused by the action of the bit. If the inflammatory action throws out ossific matter sufficient to fasten two bones together, it is called

Anchylosis.—This is classified under bone diseases, but it is the result of long union; but it may be due to fibrous structures thrown out from the ligaments, tendons, etc. But if it involves the hock or pastern joint, then it is generally from ossific matter thrown out between the articulations. If the bone becomes inflamed, causing the articular cartilage to be destroyed, nature endeavors to repair this by throwing out ossific matter, and the two bones become united, until it is sometimes difficult to see any point of union. The changes were similar, but to a greater extent. In some cases the bone dies and irritates the surrounding tissues, which ends in suppuration, or a discharge of matter. The matter becomes somewhat fetid and ichorous. It destroys the hair over which it flows and smells of sulphureted hydrogen. If you press upon the matter from a fistulous opening, you may find small hard particles, which are small particles of bone which have become detached. The treatment is different in this case from spavin, ringbone, etc. Find and remove the diseased part, scrape the bone with a small bone spoon, or in other cases take a small portion of bone off with chisel. The action of certain acids will bring about a healthy action, as hydrochloric or sulphuric acid, but you must be careful in using them. If you cannot excise the bone, the use of sulphuric acid and water—one part of acid to one of water, or one to four, will bring about a healthy action. As well as local, there is benefit from constitutional remedies, as good food, tonics, etc. If in a debilitated condition, the healing process will be assisted by giving a dose of iron. In ringbone, spavin, etc., the treatment is different. We do not scrape the bone, but we arrest the action by a generous diet and counter-irritation. It is difficult to tell how these act, but they tend to produce inflammatory action and hasten the process of exudation. If the articulations are destroyed, then nothing can be done to cure or reduce the enlargement. When a portion or whole of a bone dies, then it is called

Necrosis, and it is analagous to gangrene in the soft tissues. By this we understand death, or mortification of a bone, the result of inflammation. It is not very common in our patients—that is, total necrosis of any large bone. It may be in the bones of the face, or in some of the smaller articulations. We have it in sore shins, but not often. In the human patient it is a common disease, and causes intense pain. It is not only dead but literally buried. It shows the wonderful reparative powers of nature. A large bone may die and its place be taken by new bone, which presents much the same appearance as the former bone; but a horse is not often allowed to live long enough to reproduce an entire large bone. We frequently meet with this in open joint. When a part of the bone dies it stimulates the surrounding parts, and there is thrown out more new bone, and the dead bone is carried off by exfoliation, but this is very tedious, and as a general thing it must be removed by surgery. Necrosis is frequently met with in the lower jaw, from the action of the bit. It causes more or less swelling of the soft tissues; suppuration results. Notice, if you open an abscess in this part, and you may find small portions of bone in the matter. If this takes place in the shaft of some of the large bones the process is more complicated.

DISEASES OF BONE.

Osteo Sarcoma.—This is a non-inflammatory disease of bone, and is by no means uncommon in cattle; and I believe it sometimes occurs in the horse; but I cannot recollect of such a case. It is generally due to some constitutional diathesis, of a scrofulous or tubercular character. The cavities found in the bone, if examined, will be found to contain deposits—tubercular deposits. It usually attacks the bones of the head, particularly the lower jaw; but sometimes attacks the upper jaw, or almost any bone. If animals, having this scrofulous tendency, are exposed to any exciting cause, the disease is easily set up. It usually makes its appearance upon the side, or lower portion of the lower jaw. You would, perhaps, think it was a slight fibrous tumor at first, but it enlarges, becomes irritated, and matter may form and discharge, and it goes on until it may destroy the entire jaw, destroying the alveolar cavities, and allowing the teeth to fall out. It is of a malignant character, to some extent. There is no well-marked line of demarcation between the healthy and unhealthy parts. It is said to occur more frequently in well-bred cattle. A considerable change takes place in the bone; it grows. Spicula are formed, and also these cavities.

Treatment.—Very little can be done for it. If you meet with a tumor in this region, which tends to extend forward and inward, and involving the bone, it is generally an early stage of osteo sarcoma. It grows rapidly in some cases perhaps, assuming the condition of the specimen in some twelve or fifteen months. Or, it may remain about one size for a considerable length of time. If you attempt to treat it, use biniodide of mercury, iodine ointment, etc. It has been recommended to use the knife, but by looking at the specimen present, you can see that it would be absurd to attempt to remove it. If an animal is in good condition, I do not think it interferes with the flesh as food, but if in poor condition, and much discharge of matter, it would not be very desirable as food. It is likely to cause death sooner or later.

Rickets Richitis.—This disease may occur in all young animals, but oftener it is seen in dogs than in any others. I think it is due to a deficiency of the lime salts of the bone, and possibly the nutritive powers of the bone tissues are also impaired, so that it cannot take up the salts necessary for its nutrition. It generally appears at an early age, and is more likely to occur in a weak, sickly animal, especially one of a scrofulous diathesis, and it may be produced by a scarcity of milk from the mother. If milk is withheld, the animal does not receive the proper constituents for the tissues and the building of bone. I have seen some cases from a horse doing too much serving, which tends to weaken the colt to a certain extent, and may be the exciting cause of rickets. It may result from anything that will tend to weaken an animal, especially if of the scrofulous diathesis.

Symptoms are well marked. As the bones do not contain the proper amount of earthy matter they bend readily. In the horse the bones of the leg generally bend outwards; they do not fracture, but bend. In the dog the bones bend both ways, and the bowels are more or less affected; the head may be enlarged to a great extent.

Treatment.—Examine the case carefully, and if you think the digestive organs are out of order, it is in some cases advisable to give

a slight laxative, as linseed or castor oil, and attend to the matter and see that your patient gets a regular and proper supply of good milk, or your treatment will be of little use. If the mother is in poor condition or is overworked, see that the opposite takes place. Use alkaline salts in very small doses, and you may give a dose of sulphate of iron to build up the system. The great secret is to give plenty of milk, as it has all the ingredients needed; or you may assist the strengthening of the limbs with a starch bandage or a porous bandage (a preparation for broken limbs, etc.)—anything that will tend to straighten the leg. Keep either in a comfortable box or in a small pasture, and do not allow it to run around too much. Oatmeal porridge is excellent for this in dogs and man. Bone filings are recommended, or give the dog a bone to gnaw—it is excellent for dogs. Cod liver oil is of benefit in dogs.

Fragilitas Ossium is a fragile condition of the bones. It is seen as an animal advances in life. As an animal becomes older, the bone loses the animal, or organic matter, to a certain extent, and has too much earthy or morganic salts But this may occur in an earlier period of life. Where a fatty matter is developed, instead of a cartilaginous basis, or there is fatty degeneration in anchylosis of the vertebra, this condition is present. After performing neurotomy in navicular disease, fracture may occur from this condition, the animal using the limb more after the operation, as there is no pain. But it may come from something that interferes with the proper nutrition of the bone, sometimes associated with the vertebral column, and is called softening of the vertebra. If an animal is affected with spavin, and is stiff in the back, there is, perhaps, anchylosis, due to this condition of the system, and in such cases it is not best to cast an animal, for you may fracture the vertebra. I had one case of this kind. The animal is unthrifty, tucked up in the belly, etc. If you meet with a horse, say twelve years old, with a stiff back and a spavin, tucked up in the belly, as if in extreme pain from systematic affection, nothing can be done for it.

Mollities Ossium is just the opposite, and is present in rickets to a certain extent, but a change takes place differing from rickets in certain cases.

Enchondroma a cartilaginous growth upon a bone, or more frequently met with on the ribs and sternum. It may gain a great size and the animal be in good condition. It may occur in the stifle joint, the result of some irritation; but it generally comes from some constitutional disturbance. It may occur in the hands and fingers to such an extent that the person can hardly raise the hand. More likely to occur in cattle. Judicious counter-irritation may remove these deposits to a considerable extent. These tumors are composed of the elements of cartilage—cartilaginous cells. There is seldom any ulceration, and it does not seem to affect the animal to any great extent. It possibly involves the bones of the head, but more likely the ribs and sternum.

FRACTURE.

Fracture is a solution of continuity of bone, and it is common in all domestic animals. There are several varieties of fracture, called simple, compound, comminuted and complicated.

Simple is that in which a bone is broken, and the muscles and skin not much injured, and is the most desirable.

Compound, in which the bones enter the muscles and perhaps pass through the skin, and is a pretty severe fracture.

Comminuted, in which the bone is broken and shattered.

Complicated, in which an important vessel or an articulation is injured.

Some imagine that the bones of the horse will not unite as quickly as the bones of a man. But I think they will unite more quickly, the great difficulty being in keeping the animal quiet, and the bones in the proper position. And you must restore the animal so as to be of value. In the human being the limb is frequently considerably altered in condition If such would occur in a horse, it would depreciate his value to a great extent. Fractures occur in different ways, and receive various names, according to the way in which the fracture occurs—transverse, oblique and longitudinal—and it is astonishing how easily they will occur in some cases; and in other cases an animal may receive a great injury and fracture not occur. They occur from external violence, operating directly upon the bone, as falling, receiving a kick, etc., or by external violence, causing a strain not sufficient to break the bone receiving the injury, but breaks in some other part. This sometimes occurs in the long bones. Or if a horse falls back and strikes the occipital bone, it does not fracture the occipital but the basilar process. A fracture may occur from intense muscular exertion. This sometimes occurs in operations, however careful they are performed. This is more likely to occur in young animals, breaking the union between the diaphysis and epiphysis—the union between the points of ossification. Fracture may occur from concussion. Without any weight upon the back, the animal falters, becomes suddenly lame, and an examination reveals fracture of the os-suffraginis or ossa-innominata.

General Symptoms.—Generally easily detected. The bones may pass each other, and so show it. The part may lose motion, or, in other cases, you may have to detect by crepitation, and you may find it in parts where you will have great difficulty in detecting it, for great swelling may take place, and then you can not hear any crepitation.

General Treatment.—There are certain general and certain special rules applicable to our cases. A compound fracture can not be treated with any degree of success in the horse, especially those of the tibia, humerus, etc. The parts should be brought into proper position as soon as possible—however, in a simple fracture they are not separated to any great extent—and keep them in position by some means, such as a starch or plaster of paris bandage, and use slings. A starch bandage is just factory cotton starched and applied around the parts Or use nice light splints, leather or anything of that sort. But if you use some cumbersome appliance you will do more harm than good. There is a new kind of splint used in human practice—a kind of porous felt. It looks very nice and light, and by immersing it in hot water it becomes perfectly pliable, and will take the perfect shape of the part; then apply cold water and it becomes solid. It is astonishing how reunion will take place in some cases, even without anything being done. I saw a case where pretty good recovery had taken place after fracture of the femur, without any treatment. Reunion takes place more quickly in young animals. In some cases, although ev-

erything is done properly, reunion will not take place. We also find false joints by the production of fibro-cartilage.

The Period of Union, and the manner in which bones unite, depends upon the structure of the bones and the manner in which they are kept together. There is effusion of blood around the fractured ends, and between the periesteum and the bone, and, by and by, this extravasation becomes absorbed and reparative material is deposited between the fractured ends. This is called callus. At first there is an effusion from the vessels of the bone and periosteum. This becomes converted into bone—at first spongy, but it gradually becomes firmer and firmer, and leaves but little mark, and it usually goes on in this manner. If the bones are properly placed, and the animal kept quiet, this callus will form in eight or ten days. In dogs (the healing process is more difficult and complicated where there is a certain amount of motion,) there is a ring or sheath of bone around the ends of the bone—a provisional callus—which tends to keep the ends of the bones in position; there is also a plug in the medullary canal. There are various stages. The first is extravasation of reparative material between the bone and periosteum; second, this exudation acquires a character of fibro-cartilage to a certain extent; third, internal and external callus; fourth, this sort of spongy bone becomes harder, lime salts are developed, but the ends of the bone are still distinct from each other; fifth, the permanent or intermediate callus forms between the broken ends. The provisional becomes absorbed to a certain extent. This change goes on for some time, perhaps for years. These reparative materials make the parts as strong, or stronger, than before fracture.

INJURIES TO THE VERTEBRÆ.

Caries and Exostosis.—The atlas, the first cervical vertebra, is so affected in poll-evil. If poll-evil has been present for years, the matter cannot get away; it burrows deeper, and irritation is set up and the periosteum destroyed and caries set up; and if caries is extensive, nothing can be done for it; but if only slight, touching the parts with dilute Sulphuric acid may bring about a healthy action. The parts may heal up and remain stiff; in such a case there is more or less exostosis. This may result from an injury to the parts, or from poll-evil of an ordinary cause. The bone is liable to fracture from casting the animal, or from striking the back part of the head, etc. It is sometimes necessary to remove small spicula of bone, in cases of anchylosis, or they may become detatched, and act as an irritant, giving rise to swelling of the tissues, and perhaps poll-evil; the symptoms are generally very plain. There is a discharge of offensive matter; you lay open the sinuses, and perhaps find a foreign body or a part of a bone. If you remove this the irritation will cease and the parts heal.

The Axis is also liable to injury; the odontoid process acts as a pivot, upon which the atlas moves, and is more liable to be fractured than the body of the bone. This is usually the result of violent injury. A horse running fast, falling and striking the nose, or from slipping, etc. Death is almost instantaneous, although there is a possibility of an animal living for some time. I never noticed it in the horse, but have known it in man. If the injury is anterior to the diaphragmatic or phrenic nerve, instant death is usually the result.

Other vertebræ may become diseased; there may be caries, necrosis and ossific growths, and it is hard to say what may be the cause of these ossific growths. Fractures of other cervical vertebræ may occur from being halter-cast, getting the foot into the halter and struggling violently. The transverse processes of the bones are occasionally fractured. This, as a general thing, is not attended with any very serious results. It may occur from the animal getting under the manger, or other such injuries.

Symptoms.—There is sometimes difficulty in detecting this, but if an animal has been halter-cast, the neck swollen, there is a tendency to carry the head to one side, and if you examine along the neck you may be able to find the seat of injury, and you may be able to detect crepitation. If you suspect a fracture, keep the animal as quiet as possible; bathe to allay the irritation of the soft tissues, and keep the feed-box pretty high, and keep the animal from moving the head much, and you may keep him tied up and not allow him to lie down for twenty-four or thirty-six hours. Bandaging is of little use. You may meet with a case where the animal was not attended to, and reunion did not take place, and there is necrosis of the parts; they become detached, and set up irritation; there is a discharge—perhaps heals up and then breaks out again, etc. There is some cause, some irritant, and the probability is that a piece of bone is the cause of the irritation. Cut down and remove the particle of bone. Sometimes there is partial dislocation, and the animal may live for some time. In such cases wry neck is the result. The spine or nerves sometimes becomes impaired from being halter-cast, and if you attempt to straighten the neck, the animal falls down.

Injuries to the Dorsal Vertebra.—Caries and anchylosis are not uncommon. Anchylosis is most common in aged horses, especially those used for heavy carting, and old military horses, from carrying heavy weights. But we find it in young horses, and it may be the result of an ossific diathesis. And if you have to cast an aged horse, that has a tucked-up appearance, somewhat stiff in his movements, a fracture is liable to be produced. There may be anchylosis of the transverse or superior or spinous processes. It is not easily diagnosed, but if you notice an old animal with a peculiar motion and hollow in the back, and you find nothing the matter with the feet and limbs to produce it, it is likely to be anchylosis. Nothing can be done for it. The superior spinous processes may be fractured. The withers differ in formation in different animals, some being high, and others low; and it is a good point to have good withers, but they may be so high as to be objectionable. Injury is usually produced in a very simple manner—by an ill-fitting saddle; sometimes by a cart saddle, but usually by a riding saddle, especially if the horse has high withers. It may occur suddenly, and produce fistula of the withers.

Symptoms.—There is an offensive discharge, characteristic of caries, and it possesses active properties. If but a small portion of the bone is affected, scrape with a bone spoon, or touch with hydrochloric or sulphuric acid; but if a greater portion is affected, you may use the bone forceps, and take away a portion of it, or even use the bone saw. So the treatment varies according to the extent of the injury. Fractures sometimes occur in the bones of the withers, but not often, and if produced, it is generally from rolling violently, or from external

injury. If the animal is kept quiet, reunion takes place quickly; but if allowed to run, or compelled to work, a large abscess may form and caries takes place. Remove the detatched parts. It is not very common, but may occur. There may be fracture of the bodies of the dorsal vertebra. This is known as broken-back. It generally occurs from severe injury, if from about the middle forward; but if from about the middle of the region backward, from muscular contraction. If fracture of the dorsal vertebra occurs pretty well forward, you will have paralysis of both hind and fore extremities; but if further back, paralysis of the hind extremities only. You may possible see some motion in the tail, after there is complete paralysis of the other parts. Fracture well back may occur in different ways—from getting the hind legs in the mud and trying to get out; from running away and running against some obstacle; or from being thrown for an operation—from the fall, or from struggling while on the ground. Symptoms vary. There is either partial or complete paralysis. There are cases where there is slight paralysis and the animal recovers, if it is a fracture without displacement. There is a kind of a straddling action of the hind quarters, difficulty in getting up when down. Keep the animal very quiet, and use slings—although some would object to the use of slings—I would recommend them, but not unless the animal is able to bear a part of his weight, for if he would throw his entire weight on the slings it might cause separation of the parts. If the case is severe, you are told that the animal has received some injury; he can perhaps get up on the fore legs, but not on the hind ones; there is paralysis. You move the hind leg, there is no resistance; prick him with a pin, there is no sensation. It is best to recommend the destruction of the animal. In some cases there will be great pain, in others but little.

Injuries to the Lumbar Vertebra.—Anchylosis is very common, both in the transvers processes and bodies, and it may be due to an ossific diathesis. Fracture occurs in the same manner and presents the same symptoms as in the dorsal region. If fracture occurs to the transverse processes, and the animal is kept quiet, reunion takes place quickly, but a slight motion may prevent this, and produce a fistula, and if you explore the sinus you will find a detached portion of bone.

Fractures of the Sacrum.—Most likely to occur in the transverse processes, where they are in connection with the sacrum, and usually from some severe injury, violent exertion, or from falling violently.

Symptoms are not very clear in all cases. If the fracture is but slight he may go tolerably well, but if severe there is great difficulty in moving, and from the great weight the bones are brought down, and you may locate by examination *per rectum* and having the limbs moved.

Treatment.—Just keep him quiet and allow nature to effect a cure. (You can take the credit for it if you like). He may always be slightly down in the hip, but may be able to do hard or even fast work. If there are constitutional symptoms, use constitutional treatment, fomentations, laxatives, febrifuges, etc. The superior spines of the sacrum may be fractured; it usually occurs from some heavy body falling upon the parts. It is more likely to be met with in

heavy cart horses, from the cart falling upon them, or in railroading horses, from something falling upon them. It may occur from running away. It is likely to be followed by caries or necrosis, generally caries. A portion of the bone is apt to become detached. If you have an abscess which heals, forms again, etc., then sinuses form. There is some cause for it. Cut down and remove the parts. This is sometimes difficult to do, as it may become necrosed deep down. The anterior and superior spines of the pelvic bones are liable to fracture, usually from the animal coming in contact with some hard body, as running through a doorway.

Fracture of the Pelvic Bones.—Fracture of the anterio-superior spine, generally from direct injury, from falling violently upon the ground, or from running through a doorway, or from running through a stumpy field and striking against a stump. It does not often occur from slipping. It does not interfere much with the horse's action. Keep him quiet in a box. There is great difficulty in getting reunion here. There is frequently a fibro-cartilagino us deposit forming a reunion by what is known as false joint. It may be necessary to remove a large portion of the bone, and is the only method of saving the animal. The muscles will regain their natural condition to a considerable extent; but the animal will be down in the hip, which is best detected by standing behind the animal. It is necessary to watch for this in examining for soundness. The ilium may be fractured right through the dorsum. It usually occurs from slipping or falling, and, if severe, it is easily diagnosed. Owing to the weight of the muscles the haunch is pulled down. There will be well marked crepitation, and if the bone is much shattered, and there is constitutional disturbance, as fever, the pulse running up to one hundred or more, the animal sweats freely, the blood vessels injured, etc. It is generally advisable to destroy the animal. I generally make up my mind from the amount of constitutional disturbance. The

Treaiment is to keep the animal quiet, and place in slings. It will get well in from six to ten weeks. He will be down in the hip.

The Posterior Iliac spine is also liable to fracture, and the treatment is the same.

Fracture of the Shaft of the Ilium is pretty common, and a simple fracture of it usually occurs from slipping, but may occur from falling or from severe muscular contraction.

Symptoms.—If you are conversant with the parts it is easily diagnosed. There is difficulty in bringing the limb forward, but it is astonishing how well they can walk, in some cases, but will not do so unless compelled to. If in the winter, and you are told that an animal slipped and became suddenly lame, you move the limb, and in most cases you can detect crepitation, or you may examine *per rectum*, and it may be a slight fracture, and the bones held in their places by the periosteum. Your prognosis should be favorable if in a young, healthy animal; but in an old animal reunion does not take place so readily. Keep quiet and place in slings. Although he can stand pretty well, slings assist him considerably. If the muscles are swollen, use fomentations; or, some use a plaster, to keep the parts in a fixed position. Attend to the constitutional treatment. Give a slight laxative, if the bowels are costive, and an animal may be able to do fast work. I knew one to pace in three minutes after such a fracture.

Fracture of the Acetabulum.—This is a very serious lesion, and sometimes there is dislocation of the hip joint, in connection with such a fracture. This fracture may be produced in the same way—from slipping—more likely from slipping and coming in contact with the ground. The animal can not mark the limb at all in most cases. There is severe constitutional disturbance, quick pulse and great pain. It is advisable to examine *per rectum*, and if you find it is fractured in different places, it is advisable to destroy the animal. But there may be exceptional cases, as in a brood mare or stallion; but if it is a complicated fracture, it is likely to set up inflammation, caries, exostosis, etc.

Fracture of the Pubes and Ischium is common. It occurs in the same way, as slipping, or slipping and falling, but, in three cases out of four, just from slipping, and a very slight slip may produce it. The symptoms are just about the same, but the hip does not descend quite so far as in other cases. The horse can not get up, when he lies down, without assistance, and in some cases you are able to detect crepitation. You can locate by examination *per rectum*. It is likely to extend right through the foramen ovale, but if it is just through the shaft, and there is no displacement, recovery may take place. All you can do is to keep the animal quiet. A spiculum of bone may puncture the obturator artery, causing death by internal hemorrhage. In such cases the animal sweats profusely, the pulse runs down, etc.

Fracture of the Symphysis Pubes usually occurs from slipping, and I think this is the only way it does occur. It is difficult to diagnose; there is difficulty in extending both limbs, but perhaps more in one than the other. He endeavors to keep the limbs out. There is generally no crepitation If an animal acts in this way, and you know it has slipped, examine *per rectum*. Press gently upon the bladder until it is emptied of its contents, and you can feel it. Keep the animal quiet, and a bandage around the limbs to keep them together. It may do good.

The Tuberosity of the Ischium is fractured. It generally occurs from slipping upon the haunches, or rearing and falling upon the haunches, coming in contact with some obstacle, etc.; rarely, if ever, from muscular contraction. If but a small portion is detached, reunion is apt to be of a cartilaginous deposit, or necrosis. It is necessary to cut in and remove the part, but it is more difficult in this than in some other parts. But unless this is done nothing can be done. Down in the hip is the result of these injuries.

Fore Extremities.—The cartilage of prolongation occasionally becomes diseased in fistulous withers. It gives rise to irritation, sinuses, caries, etc. Remove the diseased portion and scrape with a spoon. The scapula is liable to fracture in any part of it. This occurs from violent injury, but it is possible for it to come from violent muscular exertion. The symptoms vary according to the part injured; easily detected, especially if seen soon after the accident. He cannot move the limb; perhaps goes on three legs, and there is crepitation. If swelling takes place, as it is apt to do, then there will be some difficulty in diagnosing. Crepitation is always conclusive evidence of a fracture. If the swelling is but slight, there may be crepitation. It is not often necessary to have recourse to

treatment, unless in a blood mare or stallion—keep quiet, use slings, reduce the irritation by fomentations, etc. The spine is sometimes fractured by a kick, or some hard body; there is apt to be separation of a small part from the bone. There is discharge of pus of an offensive character, so it is extremely liable to be followed by necrosis. The shoulder joint is liable to caries and exostosis, sometimes from open joint, or severe strains, etc.

Fracture of the Humerus occasionally occurs, from violent concussion, a kick or fall, and may be either simple or compound. If it is simple and it is in a young animal it may be treated, but if it is compound it is not necessary to treat. The animal cannot extend the limb, nor throw any weight upon it; if oblique one part of the bone passes the other, and there is great swelling. There is crepitation in most cases.

The Olecranon, or point of the elbow is liable to fracture; it may occur in various ways, usually from slipping and coming in contact with the ground. If the case is not severe it is difficult to diagnose. There is no crepitation. The joint may be completely detached, and drawn from the body of the bone. We judge from the action of the animal. It bears no weight upon the limb; stands with the limb in a semi-flexed condition. There is considerable swelling. It has been recommended to place your knee against the knee of the injured leg, and by continued pressure straighten the affected limb, and direct an assistant to lift the opposite limb, and if it is fracture the animal will fall. The treatment is not attended with any degree of success, but if attended to immediately reunion may take place. There are also both caries and exostosis in the elbow joint, from strains and punctured wounds. The matter burrows down, causing open joint. The body of the radius is liable to fracture; this may be produced in the ways I have mentioned, and if compound or comminuted, it is better to destroy the animal, but if simple it may be treated. Use splints, the lighter the better; place in slings. A fracture may occur here and be overlooked. If a horse has received a kick puncturing the skin and muscles, he suffers much pain; cannot throw any weight upon the limb; the chances are ten to one that fracture has occurred, and the bones not displaced. The animal might move around for some time, lie down, and in getting up displace the parts; therefore, if you have any suspicion of fracture, keep the animal quiet for about ten days, after which there is no great danger, as a general thing.

Knee-Joint is occasionally fractured; may be from falling upon the ground, but it is rare that it occurs in this way. It is generally from concussion from galloping upon uneven ground; stepping upon a cobble stone, etc., or from carelessness in turning a horse out to run, after having been stabled for some time. The knee bones may be literally shattered to pieces. The animal cannot mark the limb; stands with it slightly flexed, and after a while extensive swelling takes place. In such a case destroy the animal; but if only one bone is fractured, it is not so easily detected. If you flex the joint, the animal shows pain. It may be treated with some success. Use a starch or plaster of paris bandage, splints and slings; but if more than two bones are fractured, there is likely to be anchylosis, and treatment is not attended with much success; but the animal might do some work if the joint is anchylosed.

Humerus fracture of the external tuberosity, of from receiving a kick, or from falling. If a small portion is detached, remove it.

Metacarpal is usually fractured from direct injury, or from concussion. It is generally easily diagnosed. If it is compound, it cannot be treated; but if simple, it may be treated with success. Keep quiet and place in slings. The small metacarpal bones may be fractured, and set up considerable irritation; but reunion will generally take place, if the animal is kept quiet. There is no necessity for putting in slings. It may be caused by striking with the hind foot. The animal is extremely lame; in some cases you may detect crepitation. There is a tendency to a bony deposit in such cases, and if it attains any great size, you may apply a blister, but not as treatment for the fracture. Sesarnoid bones act as levers, and are sometimes fractured, transversely. It usually occurs from muscular contraction, and is most likely to occur in race or steeple-chase horses. In cases of transverse fracture, the limb decends very much, similar to break-down. It might be necessary to treat in a mare or stallion. Get the parts in position as well as you can, keep quiet, etc., and be careful in applying a starch bandage, for great swelling will take place, and may produce gangrene. A fracture here may occur without displacement, when reunion will take place. There is necrosis of the sesamoid bones, from injuring or cutting the tendons. It is very difficult to treat, as there is great swelling, and sinuses are formed.

Os-Suffraginis is frequently fractured. It may occur from direct injury, but not so likely as in other bones. It is usually from concussion. It may be produced in a horse just trotting or cantering along. It may be treated with success, if simple; but if compound or comminuted, it is best to destroy the animal. You may have difficulty in diagnosing. There will be extreme lameness, but slight swelling and crepitation, but in some cases you cannot detect crepitation. Keep quiet and remove the shoe; bandage with a starch or plaster of paris bandage; apply carefully, and then perhaps a splint on both sides of the bone keeps it from turning to the sides; but if it extends down in an oblique direction, into the articulation, it is likely to produce anchylosis and ringbone; but this does not seriously interfere with the action or work.

Oscorona is rarely fractured, but fracture may be produced in the same way as those given, and may be treated in the same way.

Ospedis.—Any part of this may be fractured, and it is possible for reunion to take place. The superior process is sometimes fractured, especially if the horse has side bones. It is difficult to diagnose, and you must judge from the manner in which the accident occurred. Keep quiet. There is extreme lameness and great pain. He can not mark the limb. This might occur from a nail passing through a portion of the bone. If so, it is likely to be followed by intense inflammation, and, perhaps, gangrene. It is frequently an act of mercy to destroy the animal.

Navicular bone may be fractured, and it is difficult to diagnose. However, you might surmise it from the extreme and continued lameness. There is a tendency to an osseous exudation and ringbone. It is most likely to occur in an animal that has navicular disease, and after neurotomy has been performed, as he will not be careful in using

the limb, and nervous influence affects the nutrition of a part to a certain extent, and as there is no sensation it is difficult to detect the lesion in such cases. Inflammation and suppuration are the results, or reunion may take place.

Femur.—Any portion of it is liable to fracture, the body being the most liable. It occurs from severe exertion or direct injury. It is rare that the neck is fractured, in comparison with the body.

Treatment is not successful, but there may be exceptional cases. There is great inflammation. It is generally easily diagnosed. The limb is short-ended. He can not throw any weight upon it; and there may be crepitation, but the swelling may be so extensive that it can not be heard.

Trochanter Major.—This may be fractured, usually from the animal falling upon the haunch. There is difficulty in moving the limb, but he may throw some weight upon it. It is followed by extensive swelling. It may be treated with success.

The External Tuberosity may be fractured from a kick, but not usually, but is rather common where carts are used, from falling over the cart shafts. The animal is externally lame—can scarcely move the limb at all. Manipulation of the parts will detect tenderness. Reunion may take place, and there may be necrosis, as in fracture of any of the small tuberosities.

Condyle.—Fractured, and extends right into the articulation. Not treated with success.

Patella.—It is occasionally fractured; possibly from severe muscular contraction, but most likely from direct injury. It may be either transverse or longitudinal. If the parts are separated there is but little chance of recovery; it is very difficult in the human patient, and is worse in the horse. The only chance is for nature to throw out a large deposit, and this produces anchylosis; but if there is no displacement it may be treated successfully. It is difficult to diagnose; you know that an animal has received an injury, and there is extreme pain, but no great amount of swelling; you may suspect fracture.

Tibia is fractured in a majority of cases from direct injury. The antero-external face is not much covered with muscles, and is liable to fracture from a kick. If the bones are displaced, even in a simple fracture, it cannot be treated with much success in old animals, but it is different in young animals. It is very important, as I stated in regard to the radius, to watch closely any injury to this bone, for it may be fractured and not displaced for several days. The periosteum being very strong tends to hold the parts in position. The animal stands with the limb flexed; pressure upon the parts produces pain. If there is no displacement it may be treated. Tie the animal up so he cannot lie down, and it is best to place in slings, for if it is an injury this is the proper treatment anyway. I had a case under treatment; the owner came and took him, and drove him some distance to the wagon, and the bones separated. Placing in slings is usually sufficient, but some recommend the use of splints and bandages. It is also recommended to use a tar cord; wrap it around the limb from the foot up over part injured. It must be watched, and if swelling takes place, do not allow it to produce gangrene.

Fibula.—This may be fractured from falling, or from a kick. It is difficult to detect; you must judge by the great pain, difficulty in extending the limb, and the lameness, which you must locate by the action, the swelling, etc. It is covered well with muscle, and so crepitation is difficult. It generally terminates favorably. Place in a nice box if he can get up, or if he cannot get up place in slings. It generally takes about three months for it to get well.

Hock.—Fracture of these bones occur occasionally, especially of the cuniform bones. It may result from a kick, and have open joint with it, and it may be the result of concussion or sprain. In this case there is usually laceration of the ligaments. You may detect crepitation; keep quiet, etc. There will generally be a bony deposit, which you may call a spavin.

Astragalus.—If it is fractured there is little use in treating.

Os-Calcis is sometimes fractured; from severe exertion, generally. It is difficult to treat, especially if separated. Place in slings, keep quiet, etc. Fractures below the hock occur in the same way as in the fore extremities, and are treated just the same way, but the treatment is more difficult in the hind limb.

Lower Jaw.—It is frequently injured by the action of the bit, either from pulling on it or from the driver jerking, etc. The inferior portion is injured by the curb, the superior by the bit, or the jaw may be fractured by the action of a curb and bit. But it is not generally fractured, but irritation is set up, and the inflammatory action is kept up, and caries and necrosis are usual. The symptoms are very well marked; if the irritation is kept up for some time on the outer part, there may be necrosis. In such cases there will be extensive swelling, exudation, etc.

Treatment.—Cut in and remove the diseased parts, or it may be necessary to trephine, but it is generelly pretty easy to break down the exudation without trephining. Remove any detached particles, or the superior portion may be affected, giving rise to a flow of saliva from the mouth. The treatment is just the same. There may be spicula of bone coming out from necrosis, and not be the result of fracture, but of the inflammation followed by necrosis. Remove the particles, bathe nicely, feed upon soft food for a few days, and it may be necessary to touch the parts with hydrochloric acid to bring about a healthy action.

Nasal Bones.—These are occasionally fractured, usually from an animal coming in contact with some obstacle, as in running away, falling, or colliding with another animal, etc. The treatment must vary according to the injury. If but slight, and the bones not depressed to any extent, just keep the animal quiet for a few days; but if the bones are depressed so as to interfere with respiration, raise the bones by means of a probe, and then use an adhesive plaster of burgundy pitch. Or the bones may be literally shattered and not displaced to any extent, and are easily put in position; but if not put in position, necrosis is apt to take place.

Frontal Bones are liable to fracture in the same manner as the nasal bones. It looks like rather a serious injury, but as a general thing it is not so serious as it looks. The treatment varies according to

the character of the fracture. As a general thing the bones are not displaced to any great extent; they may be shattered; the symptoms are plain; in respiration and expiration, the bones may be raised and lowered, and there may be hemorrhage from the nose, but is not generally very serious. Keep quiet and use an adhesive plaster over the frontal bones, either longitudinally or transversely, to keep the bones in position; but if the bones are fractured and displaced, and there is an opening into the frontal sinus yet, there is no cause for alarm. The treatment is to remove any detached parts, and at first there may be difficulty in getting every piece, but in a day or two there may be some pieces that can be removed. Apply a plaster, leaving a small hole at the inferior part, to allow the matter to escape. In six or eight days there may be diffuse suppuration, and it may be necessary to examine closely and remove any pieces, or it may cause nasal gleet. The inner plate of the frontal bone may be fractured, when it is more serious, and generally gives rise to more or less cerebral disturbance. The animal is dull, but can be easily excited. Keep quiet and attend to the cerebral symptoms, and recovery may result; or he may do tolerably well for some time, and then show cerebral symptoms, and death result. You cannot be too careful with such cases.

External Orbital Process.—It may be fractured, but it takes a pretty violent blow. Inflammation is set up, and necrosis is very apt to result, and is likely to affect the eyeball, followed by slight inflammation and opacity of the cornea. Bring the bones in position; keep quiet, and perhaps give a dose of physic, and endeavor to remove the irritation of the eyeball by poulticing, opium, etc.

Zygomotic Process, when fractured, is very likely to be followed by necrosis. Reunion may take place. Keep quiet for two or three weeks; if not, necrosis is likely to take place, giving rise to an abscess, sinuses, etc.; and necrosis is often the result of inflammation without fracture.

Parietal Bones.—Fracture of these is very liable to injure the brain. It is possibld for it to occur and not seriously injure the brain, but not very probable. These bones are not very strong of themselves, but they are protected by muscles, which prevent fracture to a great extent. Fracture of these bones is generally the result of violent injury, and there is generally more or less concussion of the brain; the animal falls, gets up again, but is in a semi-comatose condition; exhibits cerebral disturbance now and again. Treatment is not attended with much success; it is usually followed by inflammation of the brain. It has been recommended to cut down and remove the portion that presses upon the brain, but it is not attended with much success in the horse; but there may be cases where it is advisable to do it. A fracture may occur and produce cerebral disturbance, and the patient recover, but it is not a general thing.

Occipital Bone—the occipital crest. Fracture of this usually occurs from the animal raising the head and striking it against something, or from falling back and striking the ground. If a slight fracture, reunion may take place. An animal may fall or strike this, stun himself, get better and nothing is thought of it; but irritation is set up; there is swelling between the ears, suppuration, etc., showing that there is caries and necrosis; treat as such. I have met with cases

where it was necessary to remove a great part of the crest; or scraping will do in some cases. You may have this irritation without fracture.

Basilar Process of the occipital bone. Fracture of this occurs from striking the occipital crest, which fractures not the crest, but the basilar process. As a general thing it is speedily followed by death. But it is possible for it to occur and produce concussion, and the animal recover. It is not uncommon to find an animal killed from rearing and falling back, and striking the occipital crest. By opening the mouth you can perhaps detect it.

Lower Jaw may be fractured in various ways—from being kicked, getting fast, etc. It is a serious injury; but we meet cases where reunion will take place if it is a simple fracture. Feed upon sloppy food, just enough to sustain life without calling the muscles into action. Use any means of keeping the bones in position. Some advise what is called a cradle, which is just made to fit the jaw. It may be made of gutta percha or of bass wood. It is necessary to apply it to the sound side as well as to the affected one. Pad the cradle nicely with tow or cotton. The porous substance, I think, is preferable, as by heating it can be brought to the exact shape of the jaw. It is necessary to keep the cradle in position, which is done by straps, one behind and one in front of the ears, and an elastic one lower down, so as to allow the action of the muscles, and exercise your ingenuity the best you can. If the bones are not displaced, treatment is not so difficult. In fracture of the nasal bones, it is sometimes necessary to insert a plug, but only on one side, as the horse can breathe only through the nose. Either of the maxillary bones may be fractured, in about the region of the incisors, possibly, but rarely, from falling, but it may be done from getting fast. If it is but simple, keep the bones in position, keep quiet, feed upon sloppy food, and give but little food for a few days, and apply a small bandage around the under jaw. A piece may be almost detached, in which case it is generally best to remove it, even two or three alveolar cavities.

Head of the Ox.—It differs in arrangement of the bones. The ox uses his head for offense and defense, and the bones are stronger. The crest is formed of the frontal in the ox, and in the horse it is formed of the occipital. There are numerous sinuses, and the brain is more protected than in the horse. Extending from the frontal bones are the supra-orbital processes. Fracture may occur in connection with these parts, or of the frontal bones, but it is extremely rare. But the flints are often injured. The first appearance of a horn or flint is about the fourth or fifth month of gestation, and about the ninth month there are small protuberances, which puncture the skin, and they grow until the animal is about three years old or more, and in some cases gain a considerable size, and are absent in some cases. It is supposed that at one time all breeds had horns, but by certain modes of breeding the poll cattle were produced. Texas cattle have enormously developed horns. In Abyssinia they gain a great size, and some cattle are raised for the horns. The growth of horn interferes with the development of the body. The food taken goes to develop horn. The horns are largely supplied with blood vessels, so that in examining we place the hand at the root of the horn to ascer-

tain the state of the circulation. It is a very tender part. A slight blow upon the horn produces great pain. The horn may be completely knocked off, and this may be followed by considerable hemorrhage, which can be reduced by bandaging and using styptics, as iron or acetate of lead. A tar bandage is recommended, but it may interfere with the development of the new horn. A new horn is sometimes pretty well developed—blood is extravasated, and, by and by, absorbed, and horn is produced. There may be fracture and no displacement. In fracture, get the parts into position, and keep them in position. There may be abnormal growths upon the part, attaining a considerable size. It is generally best to prevent this by caustics, or cut it off completely, especially if it attains an unsightly mass. Saw it right off, and exclude the air by putting tow in the place, which may be saturated with carbolic acid. There is connection from the nasal chambers right up almost to the tip of the horn. Sometimes, when cattle have catarrh, it is apt to be followed by chronic inflammation of the lining membrane of the horns, giving rise to nasal gleet. This is more likely to occur in poorly kept cattle. The animal carries the head to one side, and in some cases the horn will literally fall off. This has given rise to what is called hollow horn. However, the horns are naturally hollow—more hollow in old or debilitated animals than in young healthy ones. If matter accumulates in the horn, make a hole and let it out; but if it accumulates to a great extent, I think it is better to saw the horn right off. When the horns are shaping, it is possible to make them almost any shape desired—being directed by means of tubes—and gutta percha horns have been so placed as to puzzle some good judges until the award had been given. In the horse we detect the age by the teeth. The same applies to cattle, but in cattle you can form a very good idea by the horns. The first ring forms when the animal is between three and four years old, and one ring each year after. If there are three rings, the animal is six years old. But this is not entirely correct. The rings may be filed or sandpapered down, and it is well to look at the teeth. Other bones of the head may be fractured, but it is not very common.

Osteo Sarcoma is very common in cattle. It is found in either the lower or upper jaw, mostly in the lower jaw. There are sometimes grubs in the sinuses of the head; they get in the same as the warble; the larvæ is deposited, and it gives rise to the grub. This is different from the hydatid, which gets into the circulation by way of the food.

Osteo Porosis may be described as a non-inflammatory disease of bone, and is more common in some localities than others; comparatively rare in Canada, Britain and Europe. It is found principally in the United States, but it may be found in Mexico, etc. It may be characterized as a disease of growth, as it rarely attacks an adult animal, and if it does perhaps the disease was there in early life. It attacks them from several months until three or four years old. I think it has been noticed in the human being. It is due to an excessive development of the tissues which occupy the canals and cells of the bone. The walls of the cavities become thinner and thinner, until the cavities communicate with each other. It is due to development of the vascular and fibrous structures without a corresponding increase of the osseous and cartilaginous constituents; although the bone is increased in size it is lighter; in this it differs

from osteo sarcoma, in which it is increased in weight. In osteo porosis the bone becomes brittle; it generally shows itself first in connection with the cancellated tissue. Big head is a name applied to it, from its attacking the head, and the bones increasing in size. It is not confined to the bones of the head, but it also attacks the long bones, and takes on just the same form; the least injury will break the bones, from their fragile condition. It is sometimes difficult to give the distinction between osteo sarcoma and osteo porosis.

Causes.—It is difficult to say what are the causes; there are various opinions; some say it is from animals grazing upon land deficient in salts of lime, but it is common in Kentucky, and that is a limestone country; there is lime in the water to such an extent that the animals frequently suffer from urinary calculi. I think it is due to grasses on low lying swampy lands. The grass grows luxuriantly, but does not contain the constituents for the proper development of bone. Grain is also liable to produce it; it is possible that there exists a slight difference in corn grown in different localities. It is enzootic. In early days some places produced this disease, and as soon as the country was cleared and drained it was not so common; in Canada this is the case. I have known some affected in the South, and brought north to Canada, and a great improvement was the result. Horses that suffer from miasmatic influences in the South come north and become valuable. I have seen two cases, both of which were fed on grasses grown on low lands.

Symptoms are perhaps not very well marked. The animal is occasionally dull, the appetite impaired, but not gone. The colt does not ramble and frolic about as in health; it slowly loses flesh. The muscular system becomes soft. It shows itself more in the head, and the long bones containing much cancellated tissue; the belly is tucked up. These symptoms may exist for some four or six months before the true nature of the disease shows itself, then there is enlargement of the bones of the head; a close examination showing one side larger than the other, perhaps the bones of the jaw just thickened slightly; but there may be considerable change without enlargement. The superior maxillary is generally the first affected; but the limbs become affected; the animal moves with difficulty, with a sort of stiff action (not a real lameness), and is not well marked until the disease reaches a certain stage; as the disease advances, the symptoms increase; the bones enlarge until they sometimes interfere with respiration, and I believe there is more or less discharge from the nose; and you might think the animal was suffering from matter in one of the sinuses, but it is not confined to one place; the whole of the bones is enlarged; the humerus shows an enlargement, if closely examined. There is no great harm in trephining the sinuses, which is easily done. The circulation is very weak, but not quickened to any great extent. These symptoms continue, and the animal may die from anæmia or from fracturing some of the bones, perhaps just while walking along; or, it may die from exhaustion.

Treatment is not generally attended with much success, and if the disease goes on to any great extent it is best to destroy the animal; but if in the early stage, change the food, and if possible remove the animal from the place where it has been, and recovery may take place. Give food of the very best quality; use mineral acids; or, you may try just the opposite—alkaline salts, which some recommend; try

tonics, such as iron, and if one does not benefit, try some other; but I think the great secret is in a change ef food and locality. In summer turn on pasture, and give some oats.

Splint.—An inflammatory disease of bone. It is an exortosis or bony enlargement, between the inner small and the large metacarpal bones, usually about the lower part of the upper third, but it occurs in different places, lower or higher. Horses used upon the hard road are perhaps oftenest affected. It does not often prove very detrimental, but according to its situation is productive of more or less harm. If it is close to the knee, it is apt to set up more or less irritation in the knee joint.

Pathology.—It is due to circumscribed inflammation of the periosteum and bone, and a slight irritation may produce this in the inner layer of the periosteum. It is sometimes due to inflammation of the periosteum without the bone being affected. It is oftener met with in young animals, owing to the periosteum being more vascular, the exudation more abundant, and more readily converted into bony material, but it may occur in old animals.

Causes are predisposing and exciting. Certain breeds are more liable to splint, spavin, and ringbone; a small limb below the knee is more liable; it is hereditary or predisposed; the mode of usage, as irregular usage; a very fat animal, especially if light limbed, is liable to a splint. The exciting cause: fast riding or driving upon hard roads. It is oftener found in these than in race horses, because their work is upon hard roads. Perhaps one-third or one-half of the young horses coming into the city of Toronto have splints, from the character of the streets. The mode of shoeing has a tendency to produce it. A heavy shoe, which subjects the bone to concussion, a blow or striking with the foot, etc., at first gives rise to a slight serous abscess, and afterward to a well marked splint. It may occur on the outside of the limb, even in a well formed limb, but it is more apt to come if the animal is slightly intoed, or as the result of direct injury. They are sometimes seen on the metatarsal bone, and may give rise to lameness which is difficult to locate until a deposit is thrown out. It will be nearly the lameness of spavin. Splints sometimes attain a great size without the horse showing much lameness; in other cases the lameness is severe. Lameness is, in most cases, due to an inflammation in the periosteum and bone. It is said to come from the deposit coming in contact with the ligaments, but the hard parts generally give way to the soft tissues. A splint may extend right across the metacarpal bones, affecting both sides of the limb, and is called a double splint.

Symptoms.—It is easily detected after it attains some size, and by its great size it is sometimes taken for the cause of lameness when it is not. A small splint oftener produces lameness than a large one. It is most common in young horses up to three, four, or five years old. The action of an animal with splint is peculiar, and after seeing one or two cases you can then recognize it. When walked he will go tolerably sound; will not flex the limb as much as natural. If trotted at a moderate pace he drops extremely. This dropping is symptomatic of splint lameness; if it is present examine carefully; run the hand carefully down the inside of the limb; press carefully with the fingers; if a slight enlargement is felt, and the limb is lifted, then press more, and then trot him, and if the lameness is more it

assists you in determining the disease. The foot is not hot. It is a very good plan to take a small piece of wood and tap upon the bone, just gently. The animal lifts the foot and exhibits considerable pain, and you can judge much by the age of the animal.

Treatment is, as a general thing, successful. Give rest, if you can, but you will sometimes be able to treat without laying off work. If in a horse three or four years old, give a laxative diet or a dose of physic. Cold applications are beneficial, and cold water applied for an hour at a time, two or three times a day, will cause the exudation to become consolidated, and complete union of the two bones takes place, and the tenderness and lameness are removed. Hot applications are also useful; but you can, in most cases, get rid of a splint quicker by a blister than any other way. Use one part of biniodide of mercury to four of lard. Seatons are useful, especially if the splint is near the knee. Insert it and leave it for three or four weeks; take out and then apply a blister. The firing iron is recommended, but I do not recommend it unless it is the bunting iron. As a general thing they will give way to the treatment I have given you. Periosteotomy is useful in a case suddenly developed in a horse in good condition—five, six or seven years old—but if it has a tendency to attack both sides, it is not attended with much success. Just make an incision through the skin; insert your knife and make an incision through the periosteum, then foment and poultice, and, perhaps, in some days after, blister. Some recommend a seaton instead of a blister. There is no necessity for blemishing an animal for splint. Such a cure is often worse than the disease. There may be cases where it is necessary to use the bone forceps, or the bone saw, or if a spiculum of bone projects, cut down and scrape it. There are different opinions as to whether splint is or is not an unsoundness. If I find a splint in the usual place, with no pain nor lameness, and not likely to become lame, I would pass him as sound; but if a splint is well marked, I might mention it to the party, and say it is not likely to ever lame the animal. But if you find a splint close to the joint, in a horse four or five years old, although he is not lame, I would not pass him as sound. Take into consideration the form of the limb, the place of the splint, etc.

Sore Shins—Inflammation of the periosteum of the metacarpal bones. The inflammation more of a diffused character than in splints. It is common in some parts of the country, and is becoming more common in racing horses. It is rarely met with in horses used for ordinary purposes.

Pathology.—Inflammation is set up in the periosteum. The result is an exudation between the periosteum and the bone, and not only this, but between the periosteum and the areolar tissue, with which it is in close connection; thickening of the periosteum; and if the exciting cause is kept up, it may cause partial necrosis of the metacarpal bone; but this is rare.

Causes are violent and continued concussion, to which horses are subjected in training, particularly young horses, in which the periosteum is very vascular. It may occur in old horses, but usually in young animals. Predisposing causes—taking a colt in a heavy gross condition; putting him to work without first getting in condition for it, by a dose of physic or exercise. The concussion sets up this irritation.

Symptoms are very plain after a time, but at first it is hard to account for the lameness. The lameness is seen sometime after the exercise. The inflammatory action becomes more severe if the exciting causes are kept up. He drops very much the same as in splint, and you can notice an enlargement on the front of the bone. Pressure upon it causes pain. There is increased temperature of the parts. If the exciting cause goes on, the exudation increases more and more, and the animal suffers great pain. I have seen some so severe that, after being handled once or twice, if you but pointed at it, the animal would run back. Sometimes one and sometimes both limbs are affected. There is a peculiar action. I have seen horses severely blistered upon the shoulder when nothing was the matter but sore shins. By and by the exudation becomes organized, producing a well marked case. This exudation will always remain, which can be detected by examining; but the lameness ceases, and it is not counted an unsoundness.

Treatment.—If taken in the early stage, it is easy to reduce the inflammatory action. Give rest; give laxative medicine in some cases. If the animal has been fed upon stimulating diet, change it. Apply cold to the parts. Give nitrate of potash, one ounce; sal-ammonica, one ounce, in water. Use acetate of lead, and if there is much pain, combine it with opium; or use equal parts of the tincture of opium, camphor and arnica. After the pain and imflammation are relieved, apply a blister, which will relieve it better than anything else—and I cannot recommend any better blister than biniodide of mercury, one part, to four, five or six of lard, according to the case, and rub in well, and let it extend up the limb for some distance. Keep it on for a day or two, and wash off and blister again, as the case demands. Give gentle exercise, and in the summer use plenty of cold water. It may be necessary to make an incision into the part, but such cases are rare, but if there is great exudition it might prevent it from becoming organized. You may meet with a case in the hind limbs from other causes, as in jumping fences and striking with the limbs. The result is extensive swelling, and benefit is sometimes derived by making an incision. There is no specific for sore shins. It is hard to say how blisters act, but they are attended with benefit. We find also a slight inflammation set up in the upper part of the fetlock joint, and again it may be right above the knee—the result of concussion—and a large bony deposit may be the result. The symptoms are nearly the same; it is difficult to locate the lameness. For some time he can walk tolerably well, but drops much if trotted. It will disappear after a while, and if allowed to stand it returns.

Treatment.—Give rest, fomentations, cold applications, and blister, and it might be advisable to make an incision, but be careful, especially if in the neighborhood of articulations. What is called obscure lameness is often inflammation of the periosteum of the fore leg.

Ringbone.—This is a common disease; it is an exostosis situated in the region of the pastern joint, the articulation between the oscorona and ossuffraginis. Ringbone is applied to any exostosis in that quarter, but if it is just upon the bone and does not involve the articulation it is not very serious. It may affect any limb, but oftener the hind limb. Inflammation is set up—it may be in connection with the cancellated structure at the extremities—and gradually extends and destroys the articular lamella and articular car-

tilage. Nature, in endeavoring to overcome this, throws out material which becomes converted into bone, and anchylosis is the result. At the same time there is an exudation thrown out between the periosteum and the bone, and there may be exostosis without the true joint being affected. Complete union of the pastern joint is the result of ring bone in some cases. The exudation extends around the articulation, hence the name ringbone.

Causes.—I believe it is hereditary, and comes by breeding from weak, sickly animals, predisposed to ringbone. Certain grasses may have a tendency to produce it. The exciting causes are hard and fast work, especially in young animals; direct and indirect injury; injury to the articulations. An injury to the foot may produce it—a nail in the foot, causing the animal to stand on the sound foot for weeks and weeks, may produce it in the sound limb. Another is farmers allowing foals to run after the mothers while at work.

Symptoms.—If of any size it is easily detected. When it is forming the animal is more or less lame; but sometimes a deposit takes place of a soft character, and this becomes converted into bone without much lameness. The lameness precedes the enlargement for some time, and it is difficult in such cases to say just what the irritation is. There is heat around the hoof. You may, after some time, detect an enlargement, and flexing the articulation gives pain. If it involves the articulation of the ospedis in the fore foot, the animal will walk on the heel, similar to chronic laminitis, and the hoof, stimulated by the inflammation, has a tendency to grow in rings.

Treatment is not very satisfactory in many cases. The treatment must vary according to the disease going on in the bone. If in a young animal, and the articulation is affected and the hoof out of shape, bring the foot in shape the best you can; allay the irritation by hot or cold applications, and then blister. Seatons and firing irons may be of benefit, and you may be justifiable in performing neurotomy. The firing iron is generally the most potent. Now these remedies act by setting up a new inflammatory action, the result of which is reproductive material thrown out, producing anchylosis of the articulation; after which the irritation ceases, and the enlargement may be reduced to a certain extent, but not completely. Cutting the "feeder" of a ringbone, as some say, may prove beneficial from the irritation set up, not from taking away the food of the bone. Even blistering and firing in some cases have but little effect.

Side Bones.—This is ossification of the lateral cartilages. This is different from and more simple than ringbone. It is oftener met with in heavy breeds. As well as being ossified, they become enlarged, producing an osseous tumor. This is not uncommon in the heavy Clyde horses, and in them it does not so seriously interfere with their usefulness. It is more apt to set up irritation and cause lameness in light driving horses; and if you are examining such, and side-bones are present, condemn him; but in a heavy horse, just acquaint the parties with it, as it sometimes gives rise to lameness. Such an animal may become affected with corns, and if so, the irritation is severe.

Treatment.—Cut the under portion of the hoof well down under the side bones; reduce the irritation by poulticing; use hot or cold applications, and follow by a blister. It is not often necessary to have recourse to firing. Use a bar or three quarter shoe.

Osteophytes—A slight exostosis involving the upper part of the fetlock joint. It is at first merely inflammation of the periosteum. It is common in race horses. The symptoms are peculiar. If the horse gets a hard ride, there will be great lameness and heat in the parts. You might almost think some of the ligaments were ruptured. So long as used for moderate work, he seems almost sound, and you may have difficulty in diagnosing. Although extremely lame, he will be much better after standing over night. After a few days, having hard work, it will again show itself. These enlargements may attain a considerable size. Give rest, foment, etc., and follow by a blister. Splints that have to be treated while the animal is at work may be treated by cold water or a mild ointment of mercury, not a blister, but a stimulant. There are bony deposits in connection with the ligaments and tendons. These osteophites may appear in other parts of the body—deposits, such as a tooth, may be found in various parts of the body.

Spavin.—When we speak of spavin without any distinction, we mean bone spavin. It is an exostosis or bony growth, situated on the antero-internal part of the hock joint, and may or may not be accompanied by caries of the internal structures. There are two kinds—one from inflammation of the periosteum, which is confined to the external part of the joint; the other arising from the internal parts, giving rise to caries. A slight blister applied in one case will relieve; in another it will not. The one case was external, the other internal. The hock joint is complicated and beautiful; the bones are so arranged as to give great power; yet by the great strain, they are frequently diseased. There are different articulations—the true joint and the gliding motion between some. If the joint is much affected, action is also affected. Spavin occurs on the inner side of the limb, as it is near the center of gravity. It is found in connection with the cuneiform, magnum, medium, and parvum.

Pathology.—If it is high up, it is not so easily treated as if lower down. A low spavin is in the small articulations. A high spavin is about an inch higher up—not very large, and generally associated with caries. If it occurs when the horse is five or six years old, low down, there is a chance for successful treatment; but if higher, and there is much heat in the joint, it is much more tedious to treat. It may be produced by inflammatory action set up principally in the periosteum, and in some cases a comparatively trivial cause; but if the lameness is more severe, it is likely the inflammatory action is set up in the internal part of the bones. There is an exudation thrown out between the bones, and also between the periosteum and the bones, and sometimes complete anchylosis of the articulations is the result. Spavin may involve more or less of the entire gliding articulation, or even the entire articulation. You may have anchylosis of the cuneiform bones without any external deposit.

Causes are predisposing and exciting. The first are either constitutional or local. There may be an ossific diathesis, or from the formation of the hock. A narrow hock from before back, and a long metatarsal bone, predisposes to it. The exciting causes are hard and fast work; driving a young horse fast upon hard roads, especially if not in a fit condition; or a severe strain, setting up irritation in some of the little inter-osseous ligaments, extending and involving the entire joint; and it is sometimes the result of undue weight upon the

limb. Anything that will set up concussion will produce it. Shoeing is said to be a cause, as with high-heeled shoes extreme flexion causes irritation of the cuneiform bones, and proves an exciting cause. Receiving an injury to the foot, causing the weight to be thrown on the sound limb for eight or ten days, produces concussion, and spavin results. Hence the necessity for using slings in cases of injury.

Symptoms.—If it is large it is easily detected. But we sometimes meet a case of lameness where the inflammation is going on and there is no enlargement. Look at the natural hock; look at the bones in their natural condition—at their natural prominences—and endeavor to become conversant with the natural appearances of the hock in a healthy animal. There are certain prominences under the malleolus, and they vary in size during health—in some small, in others larger—and it is not a bad sign to see them well developed. The lameness, in most cases, precedes the exostosis. The lameness is characteristic, and is best seen when the animal is first brought out of the stable. After driving for some distance it will, perhaps, disappear, and will show no more lameness during the day. And sometimes there are cases where the exostosis attains a considerable size without the horse being much lame. A pretty good way of detecting it is by the eye, (but this will not do to rely on in all cases). Make him stand square upon the limb, and throw his weight upon it, and stand just to one side of the horse in front, and take a look from the internal malleolus down, and look through between the fore legs from behind, etc. But just standing about eighteen inches to one side the horse's head is a very good position, and then draw the hand carefully over the hock. If it is the left leg, just pass the right hand down over the hock, and you may detect a bony enlargement and heat in the parts. If the animal is standing, he will flex the limb to some extent. In a case of long standing there are other changes. The whole nutrition of the limb is affected, and there is wasting of the muscles of the haunch; and this may mislead and cause you to think this is the cause of the lameness. He walks upon the toe to a great extent. Turning the horse from side to side will assist you in determining the seat of lameness. If it is slight you must judge, to a great extent, by the action of the animal, and you must be careful if a horse has a very large spavin, and becomes suddenly lame, for it may be that the animal has picked up a nail, and in such a case you may overlook the true seat of the lameness—more especially if he is extremely lame. It is a good practice, in many cases, to take a look at the foot, for I have known blisters applied to the hock when the trouble was in the foot.

Treatment.—It is difficult to say whether you can cure or not; you cannot restore the limb to its natural condition; so far it is incurable, nevertheless if the animal can be got to go sound it is what we call a cure. We cannot take off a spavin, but hydrochloric acid will take off the enlargement to a certain extent, and it acts beneficially as a counter irritant. The best treatment is to give rest, and if the feet are out of shape bring them into shape the best you can. Some recommend a certain kind of shoe—a high heeled—but I think it is best without any shoe. Keep in a box or stall in preference to turning on pasture. Those who have become proficient in treating spavin have become so by devising means to keep the articulation quiet. If there is acute inflammatory action use hot and cold applications, and follow by counter irritation with mercury or cantharidies, or you may use eupherbium, or the firing iron. If there is an exostosis, and

the articulation not much affected, you may use the small bunting iron; just make one or two points, but not too close together, and blister after a day or two, but not very severely. If the whole articulation is affected, fire clear around the articulation. Seatons are also good. Some object to a blister; then use a seaton. Some recommend dividing the tendon of the flexor metatarsi, and this might be advisable. Punching was at one time practiced to a great extent; take a punch and strike it in with a mallet. Caustics have also been recommended, but they are hard to control, and are likely to cause extensive sloughing. In examining for soundness you must look to the hock, and if you suspect anything wrong, before giving an opinion allow him to stand quiet for an hour or two, and notice whether he flexes the limb. Make him stand from side to side, then bring him out and notice his action, and take plenty of time in giving an opinion. If the bones are larger than ordinary, or larger in one hock than the other, it is a little suspicious.

The peculiarity of the lameness of spavin is dragging the limb to some extent. If trotted, there is well-marked raising and dropping of the haunch, and it takes practice to locate this lameness, and often a person of experience may be mistaken. Walk him back and forth, and when so doing, watch the haunch rise and fall. The affected limb will be flexed when the animal is standing. There is wasting of the muscles in cases of long standing. Inquire how long the animal has been lame, for it takes some time for wasting to occur in spavin; but it may occur from severe injury quite quickly. In some cases there may be a thickening of the skin, which looks much like spavin. The

Treatment consists in a counter-irritation in some form or other. In treating, when you have plenty of time, keep the animal quiet for a few days before applying counter-irritation; also, get the foot in shape and keep the shoe off in a majority of cases; however, some recommend shoes. The firing iron is generally the most potent; its action is not only superficial, but extends and involves the bones to a certain extent. Fire entirely around the joint in some cases, and pretty severely, if necessary. We do not fire to get rid of the enlargement, but to set up an inflammatory action and hasten anchylosis. In firing, you may make the strokes in any direction you like, but not too close together, as it might cause sloughing. It is a question whether it is best to apply the blister immediately after firing. The blister will not act so readily as it would after three or four, or even six days. I think it is best to wait; it has a better effect, I think. But if you only fire one or two lines, then you may blister immediately; but if you fire extensively, wait some time. If you use the pointed iron, endeavor to insert it right into the exostosis, and as a general thing it does not blemish. There are other irons with a number of points, which may be used, but it is likely to cause sloughing. The punch is also used, and it is better to knock it in with a block of wood than with a hammer. A seaton is another form of counter-irritation. It is beneficial, and sometimes preferable to the firing iron, for the firing iron will blemish if you fire severely; and if you fire only slightly, you might as well blister. In inserting a seaton, you may or may not have to cast the animal; just make an incision with the scissors, and insert the seaton, and keep it stimulated with a weak solution of biniodide of mercury. Take into consideration the animal, and also the owner of the animal; if seators have been used in that locality, use seatons. It is recommended to cut the tendon of the flex or metarsi.

This would be successful if it was due to pressure of that tendon; but if it comes from the internal parts, it will, of course, do no good. You may often feel perplexed in examining for soundness. If a horse is eight or nine years old, though spavin is present, it does not interfere much with his work, yet it is an unsoundness; but in a horse three or four years old, it is likely to produce more or less lameness.

WOUNDS.

A Wound is a solution of continuity in soft parts, and wounds are of various kinds—as incised, lacerated, punctured, contused, gun-shot and poisoned.

Incised.—An incised wound is where the tissues are smoothly divided with a cutting instrument, and its length exceeds its depth. If it is parallel with a large muscle, it does not, in some cases, prove very serious; but if across the muscle, a great, gaping wound is the result. A

Punctured wound is produced by a sharp or blunt-pointed instrument, and the depth exceeds the length; and this is more dangerous than an incised wound, for the tissues are pierced to some depth, the matter which forms does not escape freely, and sometimes results seriously, and, as a general thing it requires to be carefully looked after. In a *lacerated* wound the skin is torn as well as cut, as in one horse kicking another in the haunch with a sharp shoe.

Lacerated and Contused.—In these the hemorrhage is not so great as in incised wounds, for the parts cause coagulation of the blood. Contusion is where the parts under the skin are injured without the skin being cut. A horse, in traveling, strikes the limb, and affects the tissues but not the skin. It is often seen in man, as a black eye. There may be effusion or laceration of a vessel—ecchymosis is the result. It may run to effusion of serum, or to suppuration.

Gun-shot wounds are seldom seen, except during war.

Poisoned wounds are caused by some poisonous substance. The mineral acids act in this way, and, if freely applied, are apt to set up extensive irritation. I saw one case where there was extensive sloughing from binding a toad to a splint.

Treatment of wounds of course varies to a certain extent, but there are certain general principles necessary. If the wound is extensive, and hemorrhage is present, first arrest the hemorrhage, and the most surgical way is to apply a ligature to the artery. But we sometimes find this difficult, especially in wounds about the feet, and we are able, in many cases, to arrest it by other means. Compression, in many cases, will do, the result of which is coagulation of the blood. Or styptics may be used—an excellent one is the tincture of the chloride of iron. Moderately warm water will answer in some cases—in others cold water will do. Or use acetate of lead and tow, and allow the blood to coagulate in the tow, and then it will coagulate in the vessels; and there are many other styptics. After arresting the hemorrhage, carefully cleanse the wound with cold or tepid water, and, if a lacerated wound, endeavor to find how it was produced, and if by a

sharp piece of wood, it may be that some of the wood has been left in the flesh, which must be removed. The next thing is to bring the parts together. If the wound has been produced for some time, perhaps the hemorrhage has ceased. Some say it is not best to bring the edges together immediately, but leave alone and allow all dirt, etc., to escape; but, as a general thing, sew it up immediately, using a

Suture, of which there are different kinds, the interrupted, uninterrupted, quilled, twisted, and false. Use a needle to correspond with the size of the wound. You may use the metallic wire, silver wire, silk thread, or catgut. The metallic wire answers very well. Catgut is useful, especially in abdominal wounds, and it is useful to saturate it with a solution of carbolic acid. The interrupted, or glovers' stitch, is generally the best. If a large wound, look at the manner in which it took place, and determine where to make the first stitch; leave a small part near the most dependent part, for if stitched up closely serum accumulates and irritates it.

The Twisted Suture.—This is done by inserting pins and wrapping thread on them in the shape of a figure eight; you can use a pin director, passing it through with the pin in its groove. Again, we have the quilled suture, which is used in an injury to a large muscle, where the skin is injured to a great extent. It is done by laying quills or pieces of wood on either side, and the sutures are tied over them. It requires some practice and some nerve to sew up a large wound. I find, as a general thing, that if the horse is irritable it is good to lay good pressure upon the part, and take a good hold on the skin, and if the animal jerks you are not so liable to let go; and pass the needle quickly, as the irritation causes the animal to jump. Bandages are also used. Plasters may be used in some cases. Bandages are apt to do more harm than good. There is another method which is used, which does not look well but is not a bad plan: take a strong piece of ticking and attach it to the skin, back from the wound, by means of Burgundy pitch, or other adhesive plaster, and bring the parts together by means of this. The stitches do not generally stay too long, but come out of their own accord, and the trouble is to get them to stay long enough. If the wound is around the eye, the smaller the needle the better, and I like silk thread for a suture very well. There is a great difference of opinion with regard to the after treatment, even among eminent surgeons. Some recommend exclusion of the atmosphere and antiseptic dressings; some say they do better exposed to the atmosphere; some think water dressings are the best, others think not. In our patients it is difficult to exclude the air, but in human practice this is invariably done. I do not believe the atmosphere interferes with the healing of a wound in most cases. In some cases we can and do cover up, and find the healing process retarded instead of expedited. We hear of applying turpentine or black oil to wounds, but if you apply anything to a wound use some slight astringent. The white lotion is used more perhaps than any other remedy. It is made of six drachms of sulphate of zinc, one ounce acetate of lead to one quart of water, or it may be applied stronger. Carbolic acid, one part to forty of water, or some recommend oil with the carbolic acid, but water is better, as oil causes dirt to adhere to the wound. I do not recommend oleaginous preparations. It may be advisable to use an ointment, but that is the exception and not the rule. A good preparation for certain seasons of the year is tincture of benzoin, oil of tar and linseed oil. It forms a coat,

keeps out the air, etc., and seems to be of benefit. In a lacerated wound, where there is extensive suppuration, use astringents; and sometimes you find granulations or proud flesh, and sometimes the wound becomes indolent. The white lotion, sulphate of copper, tincture of iron, butter of antimony and carbolic acid of moderate strength, are of benefit; after this treat as a fresh wound. It is necessary to attend to the constitutional treatment in some cases, as well as the local. If the animal is in high condition administer a laxative, restrict the food, etc., while in others feed well on the best of food. In moderate weather hot or cold baths are often attended with benefit.

Modes of Healing.—These vary according to the wound and the condition of the animal. First, by immediate or direct union; this can take place only in an incised wound; the parts come together; a slight exudation is thrown out, and healing takes place very quickly. This sometimes takes place in pinning up an incision. In bleeding, this little exudation glues the divided surfaces together; but in a wound of any size it does not take place. This may take place in twenty-four or thirty hours; but there must be certain conditions, or this cannot take place; there must be absence of inflammation, healing by adhesion or first intention. Incised wounds frequently heal in this way. In such cases a small amount of blood is extravasated. It becomes converted into new tissue, and the divided edges of the wound adhere together. The irritation is not very extensive. Again, there is healing by the second intention; this is more tedious. In a lacerated wound or a large incised wound, when there is motion, this is the mode of union: the edges of the wound are brought together; in a short time serum is discharged profusely, and there will be a coat of this serum over the wound, and it is supposed that the leucocytes going to form new tissue are converted into pus corpuscles, and profuse suppuration is the result; little red eminences appear, and if removed or hurt, are found to be extremely vascular; they bleed readily. These are the granulations, and this is the mode of healing in lacerated wounds. In this manner loss of structure is repaired. There is also healing by scabbing; it is well noticed in our patients. In case of a slight wound, the parts are brought together; a little fluid exudes and covers it over, which will perhaps remain and form a scab, and it is very favorable fn many cases. This shows the necessity of allowing the blood to remain; and we sometimes form an artificial scab of collodium or carbolic acid and oil, which, in some cases, favors healing.

INJURIES AND DISEASES IN THE REGION OF THE HEAD AND NECK.

The first I will notice is

Poll-evil, so called from its occurring in the region of the poll. It is not a constitutional disease, but comes, no doubt, from well-marked causes—from inflammatory action set up, involving the muscles of the region of the poll, and perhaps the ligamentum nuchæ. Owing to the low vitality of the parts, and the motion of the head in taking food, etc., the matter is apt to burrow deep in the muscles. The

Pathology is just inflammatory action, set up in the region of the poll. Such an inflammation may terminate in resolution, but it is

very likely to terminate in suppuration, and anchylosis and necrosis of the bones are frequent.

Causes.—It is usually the result of direct or indirect injury. A common cause is striking the head against a low doorway; another is an ill-fitting head halter or bridle, or a yoke put on to prevent him from jumping, or any foreign body puncturing the muscles, or fracture of the superior spinous processes, which are likely to become necrosed, and set up inflammation; unnaturally tight reining is said to be a cause.

Symptoms.—There is more or less swelling; the animal stands with the nose out; slight heat in the parts; pressure upon the parts causes pain. In the first stage it is merely inflammatory action. The second stage is suppuration, and there may be great swelling in some cases, when there is but little matter formed. In other cases there is diffuse suppuration, and the matter makes its way out and discharges to the surface, and sinuses are formed extending in various directions, and sometimes the exudation becomes organized and produces an enlargement. Any abscess in this region is called poll-evil.

Treatment.—If called before suppuration has taken place, while in the inflammatory stage, just apply remedies to bring about resolution; foment and keep the animal quiet; keep the head tied up and poultice with linseed meal, bran, boiled turnips, etc., but do not apply a heavy poultice, but just enough to keep moisture and warmth to the parts. Use a mild liniment—the camphorated is good. Sometimes the inflammatory action ceases, and the skin remains thickened; then use a blister. One part each of iodine and iodide of potassium to four of lard, is of benefit. But after the inflammatory process has terminated in suppuration, the treatment is different. It should be to make a free incision, and allow the matter to escape freely, and if this is done in proper time the sinuses will not often form; tie the head up, and prevent motion. If an animal is turned on pasture, the sinuses are more likely to form from the continued motion. Syringe the parts out well with tepid or cold water. Use carbolic acid—one part to twenty, thirty or forty of water; or corrosive sublimate—five grains to an ounce of water. But if sinuses are formed it is still more difficult. It may be treated by caustics, corrosive sublimate, nitrate of silver, etc., but I recommend the free use of the knife. It is generally advisable to throw the animal, and, in cutting, follow the course of the sinuses, and open them up well. (Sometimes a seaton does very well.) It is sometimes necessary to divide the ligamentum nuchæ, and when you do a great gaping wound is the result, and there may be new tissue formed, and you may have to cut out some of this. After using the knife, use caustics. I generally use corrosive sublimate—five to ten grains to one ounce of water. Saturate some cotton or tow and put this in the place. Devise some means to allow water to run upon it for an hour or two each day, and feed from a high trough, and feed pretty well, which will benefit the healing process. Use tonics, diuretics, etc., especially if the limbs swell. You may have to remove part of the bone. There may remain a stiff neck, but it does not interfere with the animal much.

Injuries from being halter-cast. There may be very alarming symptoms. Perhaps, after the animal is released, he cannot raise the head, and if allowed to remain in this position there may be congestion, the result of the irritation, or mechanical congestion, giving rise

to alarming symptoms. The muscles or the transverse processes may be injured, and produce wry neck; the nose may be almost to the ground, the lips and nose swollen to a great extent.

Treatment.—You will be apt to look upon such an injury as being a very serious affair, but if the spine or large nerves are not affected you may expect recovery. If he is unable to raise the head, the lips and nose swollen, and interfering with respiration, scarify the lips and sides of the nose; apply fomentations to relieve congestion, and endeavor to support the head, which may be done by means of a bag put under the head, which is better than to tie up with a halter, which interferes with the passage of the blood and increases the swelling. Give a slight laxative, and persevere, and you may be successful. If it is very difficult to raise the head, he lies or falls down, then elevate the head by a bag of straw, and keep up the same treatment. Give purgatives and diuretics, and, after bathing the parts, use a mild stimulating limiment—the camphorated—or you may make it anodyne by adding opium. If the spine is injured, it is more difficult, and is likely to terminate fatally. Endeavor to straighten the neck and stimulate the parts. When he carries the head to one side, and falls down when you endeavor to straighten it, the nerves are generally affected.

Phlebitis—Inflammation of a vein. It is sometimes found, after blood-letting, and it is oftener seen in the jugular vein than in any other, as it is the one from which blood is generally drawn; but it may occur from other causes. There is diffuse phlebitis. It may occur from constitutional causes, but I will refer to that which comes from blood-letting.

Causes.—It may be due to the manner in which the operation was performed, as in a case where there is difficulty in striking the vein, or as bleeding in laminitis, even if performed correctly; so the operator cannot be blamed in all cases. It may result from the way the wound was treated, or from the horse irritating the part; so it is sometimes best to tie him up for some time. It usually appears in from three to six days after the operation.

Pathology.—In the first place there is congestion, followed by inflammation of the little vessels (vase vasorum) that supply the coats of the vein with blood. Another cause is coagulation of the blood in the vein above the part where the operation was performed, and it extends toward the head, and not toward the heart. It may extend until the circulation is arrested. Obliteration of the vein is frequent.

Symptoms are plain. I think it is ushered in by rigors or shivering—though this is often overlooked—then swelling takes place around the wound; matter is formed, the swelling extends toward the head, the vein is hard and corded; the formation of an abscess is the result, which is no doubt due to the irritation in the vein, aggravated by the manner in which the animal uses the head and neck. There is generally no difficulty in diagnosing, as it runs to some extent before you are called.

Treatment must be varied according to the inflammatory action. If noticed in the early stage, keep the head well tied up, and keep up fomentations for some four or five hours at a time; and it may be advisable to give a moderate laxative, diuretics, etc.; but I do not think arterial sedatives are of much use. If the veins have been hard and corded for some eight or ten days, I would recommend fomenta-

tions and then blister right over the region of the vein and towards the head; use mercury or cantharides. In most cases it terminates in obliteration of the vein. When the vein of the opposite side and the small veins enlarge to a certain extent, and perform the function of the one destroyed, if abscesses are formed, open and allow the matter to escape, then bathe and poultice; use any stringent lotions and then blister, but do not rub the blister into the abscesses or in the wound; feed from a high surface. It is perhaps a good practice to tie him up during the day, and allow him to lie down at night, or even keep him up for two or three days, and keep the head up until the other veins accommodate themselves to carry the blood. He should not be turned on pasture for some time; swelling of the head is apt to result, due to mechanical congestion, as the blood cannot get back to the heart in a proper manner. Obliteration of a vein is an unsoundness; so, in examining for soundness, place the finger on and try to raise the vein. If it is obliterated, it will not raise.

Thrombus is sometimes mistaken for inflammation of the vein. It is owing to the manner in which the pinning was done. It is swelling and irritation between the skin and areolar tissue. It is trivial in comparison to phlebitis. You can easily distinguish these. If it extends and is painful to the touch, it is suspicious. A thrombus is movable and circumscribed.

Treatment.—Remove the pin and carefully squeeze out the matter, and apply liniments, followed by mild lotions, and keep the head up, and you may apply a poultice—linseed meal, boiled turnips, etc.

Stiffness in the Muscles of the neck and back may come from various causes—from influenza in the spring and fall, due to a rheumatic tendency or neuroses. There is lumbago in human practice, and perhaps horses suffer in the same way. He may have great difficulty in raising the head, and will groan with pain if pulled around suddenly. If it occurs after strangles or influenza, it is best treated with heat to the parts, with camphorated and anodyne liniments, or apply heat by wringing a blanket from hot water, and put this on and cover with a dry blanket, and attend to the general condition of the animal; give nutritious food, etc. Give iodide of potassium and colchinni, one drachm each, and, if debilitated, give tonics.

Injuries in the Muscles of the Neck, caused by one horse biting another, bruising the muscles to a great extent. The skin may or may not be lacerated. Be very careful in such a case for a day or two. Although it may appear very trivial at first, it may turn out very serious. Even if the skin is not lacerated, the fascia and the muscles are bruised, causing inflammation of the head and neck, followed by suppuration, gangrene and sloughing of the parts.

Treatment.—Keep quiet, apply judicious fomentations, just a little more than lukewarm. Stimulate with mild stimulating liniments, and watch closely; especially if there is great pain in the parts, and if likely to terminate in suppuration you may make incisions, which, if done in time, will prevent slouging in many cases. Make the incisions so the matter can escape when formed. Keep the head tied up. Sometimes sloughing will take place and extend right through the ligamentum nuchæ, involving the large muscles on either side. In most of these cases this can be prevented if closely watched for one or two days. If suppuration occurs make the incisions, then poultice.

Fistula, or Fistulous Withers.—It is a solution of continuity to a greater or less extent. Fistula proper is where there are two openings—one external and one internal, opening into an internal cavity. There is no particular difference between fistula and sinuses. If there is but one opening, it is called incomplete; if two, it is complete.

Causes.—An ill-fitting riding saddle is the most frequent—being rode a mile, or even less, it will produce it. Inflammation is set up, followed by suppuration. It burrows down, often getting behind the scapula. Even the bearing of a rein will sometimes produce it.

Symptoms.—Swelling, more or less—just the same state as in poll-evil. It can scarcely be called fistula until sinuses are formed. If you apply poultices before sinuses are formed you may prevent them from forming. The matter discharged, if the bone is affected, is fetid.

Treatment is just the same as in poll-evil. Use the knife freely. Caustics and blisters will sometimes effect a cure, but they are generally mild cases. But the knife is best, and you must sometimes cut out some of the tissue. If you can give a dependent opening, it is not hard to treat, and if it extends outside of the scapula, it is simple; but if inside, it is difficult. You may insert a seaton, and you should cleanse it thoroughly, and a good way in summer is with a hose, or place a large pail above the horse and allow the water to trickle upon the part. Use corrosive sublimate, ten, fifteen or twenty grains to an ounce of water, or use carbolic acid.

Saddle Galls are best treated by removing the cause. Foment and poultice. Use white lotion, corrosive sublimate, sulphate of copper, etc. This may result in a sit-fast. This is produced by constant action of the saddle, setting up inflammation, and destroying a part of the tissues which stimulates the healthy tissue; matter is formed, the dead part becomes detached from the living, to some extent, but a small part retains its vitality, and is attached to the healthy tissue in the center, but turns up at the edges. The best remedy is to use the knife. You might get rid of it by caustics, but the best way is to cut it out, and then you may apply caustics, poultices, lotions, etc.

Muscles of the Groin Lacerated.—If the hemorrhage is great, first control it, then cleanse the parts, and then bring the divided edges together, but leave a small opening at the lower edge, to allow the matter to pass off. A punctured wound in this region is very likely to be followed by severe inflammation. Sometimes a seemingly trivial injury, if not attended to, produces very alarming symptoms, and perhaps death. Such injuries may occur in different ways, as by stepping on the end of a stick, which may fly up and produce it, or coming in violent contact with any such obstacle, or the horn of an ox. You can not be too careful in your prognosis of such cases. If the wound is inward or downward, endeavor to make it an incised wound. Make an incision in the sound tissue, which looks cruel, but it is the best in many cases, unless there is likely to be great hemorrhage. But if the wound extends upward, then this is unnecessary. Have recourse to constitutional treatment. Give a good dose of purgative medicine, if the animal is in good condition, and give diuretics, or a good dose of hyposulphite of soda. Cold or hot applications, as the season requires, continued for some time, and if used in time may prevent the symptoms of a phlegminous character. It is good prac-

tice to examine such wounds carefully. It may be done with the finger, or you may have to use a probe. Endeavor to find what caused the wound, and you will be able to judge whether fragments remain in the flesh or not.

Symptoms.—If phlegminous inflammation takes place, they are quite plain. If you are called to see a horse wounded in this region, which has been suffering for some two days, it is much swollen, the animal refuses food, the limb is swollen, not only in the region of the wound, but both outside and inside, there is increased respiration, the pulse perhaps eighty, ninety or one hundred, and weak, the chances are ten to one that it will terminate fatally, but still keep up treatment. Foment for hours at a time, and endeavor to support by stimulants—beer, whisky, etc., and hypo-sulphate of soda is said to be good. Fomentations are applied with a view of bringing on suppuration, for resolution is scarcely possible in such a case; and if it terminates in suppuration, it is generally diffuse, and of an ichorous character. Sometimes, instead of forming pus, it goes on to gangrene, the swelling continues, the limb below the parts is cold, the pulse quick and weak, etc., and death is the result. However, an animal may receive a very deep and severe wound and recover, and if there is a large opening, and considerable hemorrhage, it generally terminates better than if the contrary is the case, and I think, in cases of a large wound and scanty hemorrhage, bleeding may be of benefit.

Muscles of the Abdomen.—A punctured wound in this region is very dangerous, as it is likely to penetrate the abdomen and injure the peritoneum, or perhaps the intestines; but you may meet with an apparently severe wound, allowing the bowels to protrude, and a good recovery take place if the bowels are not injured. If you are able to get them back nicely, there are pretty good chances of recovery; but if the bowels are injured and bruised, although you may return them, it is not attended with good results, for inflammation is likely to be set up in the peritoneum and bowels; but if the bowels are lacerated, you may recommend the destruction of the animal. I saw a case where ten or twelve feet of the bowels protruded, and was in the snow; the pulse weak; the bowels were not injured; they were put back and the animal recovered. The animal generally lies down soon after such an injury as this, and you must secure him, wash the bowels nicely with tepid water, and then return carefully, and then bring the edges of the wound together—the inside first. You may use silk thread, or what is better, carbolized cat-gut; then bring the skin together. It is best to keep the ends of the sutures out, so you can remove them. Keep quiet and give but little food. A purgative is not necessary, and be careful in giving sedatives.

Perinæal Region.—A severe wound in this region, if the rectum is uninjured, may be treated with success. Hemorrhage is sometimes excessive, which you can usually arrest with a plug pressure, etc., if the artery cannot be tied.

Pectoral Region.—The result is apt to be the same as that of the groin. A deep-seated wound is apt to be followed by phlegmonous inflammation. Arrest the hemorrhage. The proper way is to take up the artery or vein; but this is not easily done (it is not good practice to take up a vein, but it is sometimes necessary, if it is a large one). But you can generally stop with tow saturated with iron or

other styptics. In a case where the hemorrhage has been excessive and has been arrested, it is best to leave the plug in for forty-eight hours, unless there is great pain. I have taken it out in twenty-four hours, and slight hemorrhage was the result; the blood coagulates first in tow, and stops the flow. If a severe injury, make a careful examination. If it does not heal for a long time, then there is likely some piece still in; or, it may heal just to break again in a few days. You may remove this, and after some time another abscess form, showing that some piece still remains. It is sometimes necessary to enlarge the wound, if there is no danger of injuring any vessels.

Muscles of the Fore-Extremities.—The belly of the muscles are liable to sprains, as well as the tendons; but this is not so serious. The fore-extremity is held to the body by muscles, which are liable to injury—those on the outer part more liable than those on the inner.

Shoulder-Slip, or Sweeny, is a common occurrence. It is called shoulder-slip in most of our works, because there is a bulging or slipping out of the joint. The muscles affected are the antea and postea spinatus, teres externus, and sometimes the flexor brachii.

Pathology of shoulder-slip, as a disease; and not as symptomatic of disease, is injury to the muscles in some way or other—a sprain, compression, or a jar, setting up inflammatory action, perhaps not severe, but interfering with nutrition; the sarcous elements become changed; the muscles cannot assimilate material for their growth; they waste or drivel until a hollow is seen in the scapula; all the elements of the muscles are there, but are wasted to some extent. The

Causes are various. It is most likely to occur in young animals, from a sudden jerk from a plow striking a stump or stone, or from the wheel of a wagon striking against some obstacle, or it may occur from the animal rolling about the stall or box, or from jumping about; but in most cases it is the result of work, and the horse going in an awkward manner.

Symptoms are very well marked. In the early stage there is, I believe, more or less swelling, but is not often noticed. The first thing generally noticed is the wasting of the muscles; or, the animal may be stiff to a certain extent, the action somewhat impaired, yet you could not call it lameness; but in some six or eight days the true character of the disease shows itself. If the outer muscles are severely affected, those on the inside of the shoulder are affected to some extent, and when the animal throws weight upon the limb, the joint bulges until you would think there was partial dislocation of the shoulder. In the very worst cases a cure may be effected; but if kept at work, it may be a long time before the muscles will attain their natural size. Keep the patient quiet for two, three or four weeks; turn loose in a box or stall; it is better than turning on pasture. First use fomentations and follow by mild stimulating liniments, as tincture of camphor, opium and arnica—equal parts. The treatment should be such as would hasten the reproduction of the muscular fibre, by keeping the animal quiet, feed moderately well, stimulate the parts and apply a blister occasionally; or you may use seatons, and if you do, use three; but there is no necessity for using very severe remedies. There is no particular specific for it. Judicious exercise after some time is beneficial. He may be used for light saddle work, but not to the plow. Incisions are sometimes made and air blown

into the areolar tissue. Those who practice it say it separates the skin from the muscles, and hastens reproduction. This can easily be detected by the crackling noise. In giving your opinion, you may give it that a cure can be effected, but it will take some time, and take plenty of time.

Enlargements on the Shoulder are common in farm horses, a common cause being an ill-fitting collar. They vary very much in their character, and it is necessary to make a careful examination and find the true character of the enlargement. When they are soft and movable or fluctuating, and have made their appearance suddenly, they contain serum, and are called serus abscesses, and are very common in the shoulder by the muscles being injured; irritation and inflammation are set up, and an exudation of serum is the result. Some are well defined, others are not. In some cases they may be hard around their circumference and soft in the center, and the hair begins to fall off. This shows suppuration, and it may be a deep-seated abscess, and if there is a large exudation surrounding this pus, which may have been there for some time, then blisters, etc. would not reach it.

Treatment.—If a serus abscess make an incision and allow the serum to escape. After treatment use fomentations or cold applications according to the season of the year, and use pressure—place a bag of bran over the part and apply pressure. These are troublesome to treat; in some cases you open it up and the contents are evacuated, and in twenty-four or thirty hours serum is again formed; then use a digestive ointment on a piece of tape, or something of the kind, saturated with a mild stimulant. The best knife for such is Sime's abscess lancet. There is another mode which looks rather rough, but it is pretty successful: if you have opened it up and used the digestive ointment and matter continues, it is good practice to cut it right open with the knife, and then treat as a wound, or you may insert a seaton through it and attend to the constitutional treatment. If in good condition give a dose of purgative medicine, if in poor condition a generous diet. If you have some difficulty in determining whether pus exists or not, get the history of the case. Notice whether the hair is falling off or not, and you may feel the fluctuating of the pus; or you may use an exploring needle, or make an incision and insert a seaton needle, and if pus is there then enlarge the opening, foment, poultice, etc. They sometimes take on an indolent character, and if it does not assume the character of a fibrous tumor use stimulants, blisters, seaton, etc. If you find this upon the anterio-internal part of the joint in a horse three or four years old, that has not been doing much work, is unthrifty, the appetite impaired, constitutional irritation, pulse quick, some difficulty in extending the limb, etc., it is generally the result of irregular strangles. The local treatment is the same, but the constitutional treatment is different; do not give a purgative if it comes from strangles. You may find tumors of a vascular or malignant character, which are more difficult to remove, but the only chance sometimes is to remove them, but there is apt to be considerable hemorrhage. The ecraseur is the best instrument for such cases, and it may take a pretty powerful instrument; there is no great damage generally in dissecting these out. The top of the neck is sometimes injured from the action of the collar; it is easily treated if the exciting cause is removed. Clip off the

hair, use tepid water and mild astringents. But sometimes they become very troublesome, a small abscess forms and bursts, heals, forms again, etc., and there is a great tendency for the matter to extend downwards. If you examine you will notice a hole extending down the side of the ligamentum nuchæ, which you must cut out; caustic may do, but it is tedious. After cutting, bathe, poultice, etc. It is good practice to tie the head up for some time—keep it well elevated.

Shoulder Joint.—The bones of this joint are held together by muscles, and not ligaments—the only ligament being the capsular. Injuries to this joint are very rare in the horse. Dislocation of this has been noticed but very rarely, indeed, but the joint may be diseased in various ways. Inflammation may set up affecting the joint and cartilages, and, if allowed to run on, anchylosis may take place. It may be due to a sprain or constitutional disturbance—a kind of rheumatic inflammation. This may come in the bicipital groove. I think the principal seat of shoulder-joint lameness is in connection with the flexor brachii muscle, which passes over the bicipital groove, in connection with stratiform and articular cartilage. It is generally suddenly produced, and readily gives way to treatment, but you may have all the changes found in other joints—inflammation of the synovial membrane cartilages, etc.—giving rise to porcelaneous deposits. Animals were at one time blistered for shoulder lameness, where they were confirmed cripples from navicular disease. It is not very difficult to tell shoulder lameness from foot lameness, by one familiar with the parts. It must be distinguished by the action, from certain parts being affected. Shoulder lameness may be produced by the animal running away, falling violently, or rough handling in breaking in. Cavalry and artillery horses are subject to it, or it may be caused by the horse being cast in the stall, or going through deep snow, or by direct injury from a stroke upon the parts. There is some difficulfy in locating it, if slight, but not if severe.

Symptoms.—There is difficulty in extending the limb, but not what you would call great difficulty. It is brought forward in a kind of rotary manner. This is better marked in trotting than in walking, but if he is warmed up it will disappear to some extent. The limb is flexed when standing, but not pointed, as in foot lameness—perhaps parallel with or just behind the other foot. You may, in some cases, be able to detect swelling, especially if in the flexor brachii, and manipulation may assist you. If you extend the limb the horse will rear up, or if you pull it back and then trot off, the lameness will be increased. Negative symptoms are useful. Look at the other parts of the limb. The best time to examine is after a hard ride or drive of four or five miles, and then stand in the stable until cooled and bring out and examine. There is a tendency to strike the toe in turning, and you are liable to think he is lame in the shoulder, when he is not.

Treatment.— It makes little difference, so far as treatment is concerned, whether it is in the flexor brachii or in the articulation; but it helps you in your prognosis if you know which it is. In one it is curable; in the other it is not. Give rest; stand in a box. Some recommend a high-heeled shoe in severe cases; I usually prefer taking the shoe off. If severe, and the limb can scarcely be moved, if there is great difficulty in getting up when down, it is good practice to place in slings; foment, use anodyne liniment, or a newly-flayed sheep skin, etc., followed by a blister, and invest a considerable surface.

Apply around the articulation, and allow it to extend down the limb. Cantharides is as good as anything. Seatons are sometimes useful. Put in about three. Do not turn on pasture, but give rest and quiet. Another way of detecting lameness is putting a stick of wood for the animal to step over. If anchylosis takes place, it is best to destroy the animal, unless it is a brood mare or stallion.

Collar-Galls are easily recognized, and if treated in time are easily gotten rid of. Remove the cause; bathe with warm or cold water; use the white lotion, etc.; irritating dressing should not be used. Sometimes the result is a sit-fast, which you must dissect out, then stimulate gently. A great deal may be done to prevent collar galls, by having the collar fitted nicely, and exposing it to the sun or fire, to dry up the sweat. There are swellings between the fore legs, which may be produced in various ways, and may be of a formidable character, the result of irritation from martingal or breast strap, or injury direct or indirect, or they may be of a constitutional character. In hydrothorax, disease of the kidneys, liver, etc., you will find these swellings. If they are from injury, remove the cause; apply heat or cold; if matter is present, open it up; or, there may be extensive irritation inside of the legs, which, in some cases, is difficult to treat. It is best treated by constitutional treatment. It may result from the horse being slightly out of condition. Give purgatives, tonics, diuretics, etc., and use the white lotion. I have found benefit from dusting the parts with charcoal. Keep quiet, for the folds of the skin rub upon each other and keep up the irritation, especially in the fall of the year.

Pectoral Region.—Injuries here occur in different ways, and sometimes do exceedingly well if the sternum and large vessels are uninjured; a punctured wound being the most dangerous. Endeavor to find what caused the trouble, and it will assist you in determining whether there are any pieces in the wound or not.

Elbow Joint.—Is formed by the radius and ulna and humerus, and there is considerable motion to it. It is occasionally diseased; sometimes there is an abscess of a serous character, or fracture of the ulna, exostosis, anchylosis, etc.; or, there may be inflammation of the joint or synovical membrane. It may result from the animal slipping and falling upon the elbow, or from constitutional causes, and is an annoying source of lameness. It is hard to find the exact seat of the disease. In other causes there is sprain of the ligaments, or some of the lateral ligaments may become completely ruptured. The caput muscles, especially the magnum, tend to bring up the leg, and are liable to injury. The symptoms vary according to the severity of the case, and is sometimes difficult to detect. We make up our mind from both negative and positive symptoms—by negative, when there is no disease in any other part of the limb. If there is rupture of the lateral ligaments, or fracture, the animal points the limb and knuckles at the fetlock. The elbow comes down to a certain extent, if walked. Sometimes, by placing the limb pretty straight, he can bear weight upon it pretty well. If it is the result of a sprain, there is more or less swelling and heat; but sometimes you do not have these symptoms. Some say there is a tendency to place the foot as in laminitis, but I have not seen this; but in backing there is difficulty in bringing back the limb. Wasting of the muscles in the region of the joint will assist you in determining it.

Treatment.—Give rest; allay the irritation; use hot or cold to the parts; blister—seatons are perhaps preferable to a blister, one inside and one outside—and stimulate them with cantharides, or anything of that kind. If it is a severe injury to the caput muscles, then place in slings.

Capped Elbow.—The most common injury in this region is a little enlargement appearing on the point of the elbow, caused by the action of the shoe when the animal lies down, causing irritation and the formation of serum or an abscess. A heavy belly band may produce it, or it may be due to the manner in which the animal lies down, even producing it without shoes, and it is necessary to wear a boot on such, although shod with very short shoes. It is easily detected; there is first irritation, and then a slight exudation; sometimes just an ordinary exudation, and sometimes it is of a serous character. Remove the cause—remove the shoe—apply fomentations and stimulate with any mild liniment, such as the camphorated, and in from three to six days it will disappear, if attended to in time. A moderate dose of physic is of benefit. If the cause is kept up and serum accumulates, it is best to open it carefully at the most dependent part, then foment and stimulate; or insert a small piece of tape with the digestive ointment, carbolic acid, etc, to prevent the wound from healing, or you may insert a seaton through it for the same purpose. This exudation may become of a fibrous character, and also fibrous pus is secreted, and it makes an ugly sore. The remedy is to dissect it carefully out. In some cases, where the exudation is becoming organized, you might arrest it by using iodine ointment, or biniodide of mercury, but if once organized then remove it. There may be considerable hemorrhage in cutting these out, but it can generally be controlled, after which bring the divided edges together. It will take some time for it to heal up, owing to the motion in the parts. When you think an inflammatory action can be set up and cause the absorption of this exudation, try counter-irritation. The elbow may be injured by slipping and cutting the point of the elbow, especially in winter. In such cases when the animal stands up you will see that the cut or incision is below the elbow; these set up great irritation. Treat with cold or hot water, lotions, etc. If the animal is driven for some distance air passes and extends right around the joint, and perhaps up the shoulder, giving rise to great swelling, which is not the result of inflammation; bring the hand over the part and you will find that it contains air—there will be a crackling noise. Foment and use slight pressure. It might be advisable to make incisions in the parts, but this is the exception. I saw this occur from trachetomy, where the air got in and extended over the entire body; the operation was performed in a bungling manner.

Injuries Below the Fetlock.—The flexor muscles are bound down by fascæ. These muscles are liable to injuries, punctures, wounds, etc., and when you notice an injury of a chronic character, and successive abscesses form and discharge, open up and examine for a foreign body. These muscles are also sprained. The belly is not sprained so often as the tendon; but this does occur. It may be done by violent action, as galloping, jumping, etc. The symptoms are well marked. There is difficulty in flexing and extending the limb, heat and swelling in the parts. Use fomentations, liniments and a mild blister. There are incised, punctured and lacerated wounds as well.

If a horse receives a pretty deep puncture in the region of the elbow joint, with a small external opening, and the animal is kept going for a day or two, matter forms, diffuse suppuration takes place under the fascia. It can not get away, but extends around the limb, causing great suffering and swelling. The matter may penetrate and destroy the capsular ligament, and cause open joint, and if you are called two or three days after the accident, and the parts swollen and tender, and perhaps you can detect fluctuation, then relieve the parts of pus by an incision, foment, etc., which will often prevent excessive sloughing. Watch such cases closely. The muscles become tendons as we proceed down. The extensor metacarpi obliques passes obliquely over the anterior portion of the region, and nature has supplied it with a bursa to enable it to move smoothly. And you often see little swellings just above the knee, which are distentions of this bursa, which has become diseased, possibly from a sprain, but generally from injury by striking the manger, or from jumping fences and striking the parts, or from a pole upon the neck to prevent jumping. Give rest, use hot or cold, water, judicious blister, etc. It is an eye-sore only, and is very difficult to remove. Endeavor to cause absorption by setting up inflammation, then use cold water to the parts. You may sometimes open them, but, as a general thing, be careful unless it contains serum. You may treat with the asperator, but it is not what it is said to be in veterenary practice.

Knee Joint.—The arrangement of the bones prevent concussion, to a great extent; still it is affected by concussion, and sometimes of a complicated character. Inflammation generally results from injury, but not invariably. It may be from hereditary tendency, or a rheumatic inflammation. There is lameness and swelling in some cases. He may walk tolerably well, but, if trotted, he drops the same as in splint, to some extent—stands with the limb slightly pointed. If you flex or rotate the limb it gives pain. If the cause is kept up, it is likely to end in anchylosis, which may be due to a bony deposit, or to a fibrous exudate, and the animal may be destroyed. The prognosis is more difficult than the diagnosis.

Injuries to the Knee Joint.—There may be stiffness, but not lameness, from the formation of fibrous tissue, or there may be a little deposit in connection with the ligaments, giving rise to more or less lameness; or anchylosis may result from carpitis. You can detect this by flexing the limb, and if the limb is in a healthy condition, you can bring the little pad, at the back of the fetlock, against the elbow; but if diseased, you cannot. Examine in this way for soundness.

Treatment.—There is no articulation that requires more rest than the knee. Devise some means to keep the limb quiet. Take off the shoe in most cases; bathe with cold water, and use anodyne liniments, and bandage nicely; and I have found benefit from a starch bandage. If there is but little irritation, and if the animal is extremely lame, use slings. Use counter-irritation, and apply around the whole articulation, but do not rub it in too hard at the back part, for it would destroy the skin and produce a sore that is difficult to heal. We sometimes apply a blister to set up inflammation; sometimes to hasten, and sometimes to arrest, same process. Seatons and firing are recommended, but I think blisters are best.

Speedy-Cut is sometimes a very troublesome enlargement, and

may appear inside of the joint. It is produced by striking; it may come gradually, and be full, hard and tense, or come suddenly and be soft. In some cases it is just contusion, just from one strike, which bruises the tissues internally; possibly there is extravasation of blood, and serum forms; or, from striking slightly, irritation is set up to a slight extent; this goes on, and a tumor comes on gradually.

Treatment.—If the cause is kept up, it is likely to end in a serious abscess. Remove the cause. Use hot or cold applications; if there is much pain, hot is preferable. But I think if cold is applied in time, when there is not much pain, it prevents the bad results. There is benefit in bandaging. Use acetate of lead and mild stimulating liniments. If serum forms, open carefully after allaying the irritation (Sime's abscess lancet is perhaps the best), then apply pressure; for if you do not, it is likely to collect again. But do not be rash in opening while there is irritation. The irritation can be reduced to a great extent by cantharides or biniodide of mercury. There are various methods of preventing striking: attend to the shoeing, and in many cases it is necessary to apply boots, sometimes from the foot to the shoulder.

The Tendons of the Knee are sometimes cut, especially the metacarpi magnum, from falling or from a kick, or coming in contact with some sharp instrument. The tendons will reunite, but in injuries here it is sometimes difficult to get reunion. In laceration of these tendons, bring the divided edges of the skin together, keep the limb as straight as possible—by splints, in some cases, and keep the parts quiet. If you are not called for some time after the accident, the horse has been moving around, the ends of the tendons recede from each other, and there is a kind of fungus growth thrown out inside of the wound; when the animal moves, this either protrudes or disappears, which shows it is in connection with the tendons. Cut the diseased portion out; apply caustics and considerable pressure. Good caustics are sulphate of copper, nitrate of silver, carbolic acid, etc. Perfect reunion will not take place, but a growth is thrown out by which the two ends are united, and there will always be an enlargement.

Open Joint is a very serious result in any articulation, and sometimes there are severe constitutional symptoms set up, and it may cause death by the constitutional fever. The joints most exposed are most liable—the stifle, hock, fetlock and knee—but almost any joint may be laid open. What I mean by open joint is where the skin, ligaments and synovial membrane are opened up. It is one of the most serious injuries to which the horse is liable, and varies much in its results. A series of pathological changes takes place unless the discharge of synovia is arrested very soon. I think if it occurs in a horse of a phlegmatic temperament, it is more easily treated than in one of the opposite condition; the constitutional fever does not run so high. Notice the character of the discharge. It is not so serious if opened with a sharp instrument, as if done in a more violent manner, for if done by a kick, or from falling, there is inflammation as well as open joint. It is sometimes a punctured wound produced by a pitch fork. In a case where a capsular ligament is punctured or injured, and not done in a violent manner, there is not very severe suffering for some time, but the synovia escapes and the air gets into the wound, sets up irritation, and then the animal suffers greatly. At first the discharge is pure synovia—if

injured in a mild manner—but a change soon takes place; in one or two days there is active inflammation, and the nature of the disease alters, there is more or less pus, and three or four days the integrity of the joint is somewhat destroyed, the cartilages become destroyed, and in a severe case partial or complete anchylosis is the result, and necrosis of the joint may occur. The tissues also become implicated, and tumefaction in many cases comes and extends around the joint, and the pus is sometimes mixed with red streaks, giving it a kind of muddy appearance, showing that the cartilage is destroyed. The pus is fetid also, the bones become carious or ulcerated, matter is thrown out, and anchylosis is the result. Sometimes the appetite is gone, the pulse quick, there is intense fever, sweats bedew the body, there is great emaciation, and death may result in from two to six days; or the surrounding tissues become infiltrated with pus, and extensive sloughing follows, or there are sinuses formed, etc., and the case is hopeless. This occurs especially in the hock joint, but if you are called in the early stage, while the discharge is pure synovia, no great fever, the wound made with a sharp instrument, and the tissues not lacerated, it stands pretty good chances of recovery.

Treatment.—Endeavor to promote the healing of the wound, and if of any size, insert a suture. Some bind with collodium, which excludes the air, keeps the wound together and prevents the discharge; or, take a small piece of cotton and saturate with one part of carbolic acid to eight, nine or ten of lard; apply it over the wound and keep it there by means of a bandage. Bandage, foment, and attend to the constitutional treatment. Keep as quiet as possible, and sometimes give a moderate dose of purgative medicine. It may heal by the first intention, or almost heal, then break, and synovia be discharged and prove fatal. Do not attempt to explore a wound of this kind. If it is a later stage, and pus is formed, it would not do to stitch it up and thus prevent the escape of it, but keep quiet and place in slings, after the animal has become tired. It is sometimes good practice to use splints, if in the knee joint, to keep the limb as straight as possible; and in fomenting be careful not to wash or wipe away any coagulum that may have formed. Poultice; and the poultice I recommend is: equal parts of flour and oatmeal—the flour tends to coagulation, and the meal soothes. Granulations spring up, and are sometimes not bad signs; but if they are too profuse, you can use caustics, or the ordinary lotion, but do not use any irritant dressings, nor inject the wound. Some recommend blisters in the early stage; others do not. They are recommended for various reasons—to produce stiffness in the joint, or to arrest the discharge, etc.—and in a case of some standing they may be of benefit. If it occurs in the knee or hock joint, to any extent, you may expect anchylosis. If the pulse is full and bounding, you may use arterial sedatives—aconite, in ten drop doses, every four or five hours, for two or three days.

Bruises of the Knee.—Although they look very formidable, are very trivial in comparison with open joint, and you may mistake the flow of the bursal fluid for open joint. Cleanse with cold water, bring the edges of the wound together and secure them; keep quiet and subdue the inflammatory action; use the ordinary white lotion, etc. Sometimes the hair bulbs are injured, and the growth of the hair is white, or even no hair at all is produced, and if the hair bulbs are destroyed, then hair cannot be reproduced; but so long as they are

not destroyed it will grow, but it may be white. Treat with any mild ointment to lubricate the skin; hand-rub, etc.

Sprain of the Flexor Tendons, so called, is not, in many cases, a sprain of these tendons, but of the

Metacarpal Ligaments.—This is very common in race-horses, and in horses pulling heavy loads, especially if they have high-toed shoes. It is not common in ordinary driving horses. It is produced by violent exertion of some kind or other; the most prolific cause is fast galloping, or in pulling up hill with a heavy load.

Symptoms are generally tolerably plain. An exudation takes place between the fibers of the ligament or around the ligament; there is more or less swelling; the horse is lame to a greater or less extent; after standing, lameness disappears more or less. Although it involves the tendons, it will be found to be anterior to them; and there is pain upon pressure, and flexing the limb increases the pain, and this may be overlooked if there is much hair upon the legs. If the animal is kept at work, the exudation increases and the animal endeavors to relieve itself by flexing the limb. The exudation becomes organized and the tendon shortens, and the animal walks upon the front of the hoof. This is more likely to take place in a heavy work horse than in a light, as a light horse would be laid off work and a heavy one would not.

Sprain of the Back Tendons takes place in the same way, and is also more likely to occur in fast or heavy work horses. It is frequent in race horses. It is usually produced by violent exertion. Horses having a bound-down formation of the limb, as it is called, are more liable to it. An animal long and weak below the knee, or standing unnaturally back—calf-kneed, as it is called—is more liable than spring-kneed. I would rather have a horse knee-sprung than calf-kneed. These sprains may be slight or severe, and may be suddenly produced. There will be more or less exudation around and in between the fibers, and if the cause is kept up it will become severe. The fibers will give way and give rise to thickening of the tendons, and they will contract and cause the horse to walk on the toe.

Symptoms.—More or less swelling; and flexing or extending the limb will increase the pain and cause more lameness when trotted out.

Treatment is just the same, whether it is the ligament or the tendon, and must vary according to the time you are called. If called immediately, apply cold water and refrigerants, and bandage judiciously to prevent the exudation. Keep up the applications for one or two hours, and watch the bandage closely, for if swelling takes place, it may interfere with the circulation. After some time apply a blister, but in some cases just cold water and bandaging will do. The animal will be able for any kind of work, but if for fast work, give a long rest. If you are not called until the exudation has taken place, and great pain is present, then use hot applications, bandage and use anodyne liniments; and, after the irritation subsides, blister, and repeat in perhaps two or three weeks. It requires not only weeks, but months, or even a year, to recover so as to undergo severe work. You would better recommend a valuable animal rested for six months or a year, than to put him to work in two or three weeks. You may derive benefit from the firing iron, and it is necessary now and again, but it

can generally be treated without it. The result of the injuries I have mentioned is

Contraction of the Tendons, in which the horse walks upon the toe, allowing the foot to grow out of shape. The only chances of bringing the parts into their natural condition is tenotomy, that is if the contraction is the result of disease of the tendon, but if it comes from some disease of the fetlock joint it would be useless. In performing tenotomy apply cold water to the parts for a day or two, to reduce any inflammation and get rid of the exudation. Cast the horse, take the limb from the hobble, and make your incision inside of the limb, taking care not to injure the artery. Some recommend introducing a scalpel first down between the tendons and ligaments. The ordinary director does very well, as well perhaps as the scalpel. First make the incision and then use a tenotomy knife—the best is a probe-pointed bistouri, and it is best to cut through both tendons, but sometimes cutting one will do—then treat as a common wound. Sometimes the animal will stand with the limb flexed, and it is in some cases necessary to apply a high-heeled shoe, but in all cases bring the foot as near the natural condition as possible before operating.

The Sheath of the Tendon is injured, but it is trivial in comparison with injuries to the fibres of the tendons. It may be done by striking with the hind foot, or if in the hind leg by some other animal striking it. You might at first think it was sprain of the tendon, but it is well back, there is swelling, and the animal is not so lame as in sprain. It is best treated by hot or cold applications, refrigerant lotions, anodyne liniments, etc., and you may find benefit from a blister; when you are called make a careful examination. The suspensory ligament is the great mainstay of the limb, and very powerful, and one upon which there is great stress; sprain of this is common, and sometimes its fibers give way completely, giving rise to what is called

Break-down.—This is more serious than sprain of the back tendons or metacarpal ligaments. In a case of this the fetlock descends and may almost touch the ground, even if there is not much weight thrown upon it. It is more common in race or hunting horses, and occurs in trotting horses, but not often. It occurs to a certain extent in very heavy horses, especially if weak limbed.

Symptoms vary according to the extent of the injury. It is not generally in a perfectly healthy condition when the fibers give way completely, but, in a majority of cases, there had been a slight sprain of the ligaments, showing a slight swelling anterior to the tendon, and a little thickening of the tendon. The animal is laid off work and treated, and again put to work, and the same thing occurs, treated the same, etc., and when put to work there is complete breakdown. If there is complete rupture of the two bifurcations, the fetlock descends; if but one, then one side descends more than the other.

Treatment is the same as that already mentioned. Give a long rest, and, unless rested a long time, he will not stand the same amount of hard work as if rested a long time. If it is complete breakdown, the limb will never regain its natural condition, but may be able to undergo a considerable amount of fast work. When there is descent of the fetlock and severe pain, the animal lies down; let him lie. Apply

fomentations and camphor, laudanum and arnica, or perhaps a little chloroform; or if you use water, acetate of lead or opium may be added. Bandage and bring the parts as near their natural position as possible. A high-heeled shoe is recommended, and may be of benefit. After allaying the acute inflammatory action, although there may still be great pain, apply a blister around the fetlock and right up where the ligaments are affected. In some cases, where there is extensive exudation, possibly involving the bone, bursa, etc., you may find benefit from the use of the firing iron. Such a horse can not be restored to the natural condition, but there will be a thickening of the parts, and the fetlock will descend more than natural. Sometimes there is only partial rupture of one of the bifurcations. Then allay the irritation, and apply a starch bandage and a high-heeled shoe, and slings are sometimes of benefit in such cases. If the animal will lie down and take good care of the limb, it is better than slings.

Inferior Sesanoid Ligaments are also liable to sprain. This may give rise to a lameness which is puzzling. It is most likely to occur in fast horses—race and trotting horses, the latter oftener suffer here than higher up.

Symptoms.—It is difficult to say which of the three ligaments is affected. There is more or less irritation, giving rise to lameness, at first slight, after fast work. After cooling off the horse goes lame for eight or ten steps and it possibly disappears. The leg is bandaged and he is taken out the next morning. There appears to be nothing wrong; there may be a little pointing of the foot, which shows the irritation is low down; you may detect slight swelling and heat in this region; trotting him causes pain. Give rest; hot or cold applications and counter-irritations; but be careful with it in this region; it may destroy the skin and hair bulbs. The tendons may be cut—usually from the action of the hind feet, or if in the hind feet, from one horse running upon another. Bring the parts together with a suture, and keep them well bandaged. Keep as quiet as possible, and, if practicable, use slings, and take a piece of iron and fasten on like a shoe, and let it come up the back of the limb and grasp the limb above the joint. Although there is thickening of the tendon, it does not seriously interfere with his action; or the tendons, ligaments, nerves, etc, may be cut off below the joint, and the hoof will take on a very peculiar growth. If the tendons alone are cut, then bandage nicely and watch closely, for the irritation is liable to extend down between the sensitive and insensitive parts of the foot and produce extensive suppuration. When it does it is necessary to cut down and allow the matter to escape. But if these are entirely cut, you might as well recommend the animal destroyed. You might produce reunion in a partial manner, but the animal is of no use afterward.

Sesamoiditis.—Sprain of the back tendons in the region of the fetlock, accompanied by inflammation of the sesamoids and bursæ. It is due to a slight sprain of the part, or to rheumatic inflammation of the joint, but most likely some injury or concussion. It is not common in road horses.

Symptoms.—On first coming from the stable the animal is slightly stiff, but this will disappear to some extent after exercising, and will again appear after resting. There will be knuckling slightly, and there is a slight puffiness around the bursæ. A careful examination

reveals heat in the parts. Flexing or extending the limb creates pain, and the animal will go more lame. There are changes that take place, perhaps a cartilaginous deposit, which may be converted into bone. In such cases lameness continues for some time, and there is a well marked enlargement around the joint, at first puffy, then hard.

Treatment.—Rest, fomentations, heat or cold, followed by a blister. We find other causes of slight sprain, and it is hard to say what is the exact lesion. It is usually produced by hard or fast work upon hard roads, or hard pulling. He may extend the limb pretty well, but if trotted, there is difficulty in distending the limb. There may be anchylosis of the joint. When you see a horse knuckling in the fetlock, do not make up your mind that the disease is in the fetlock in all cases; but it is symptomatic of disease of the fetlock. Use hot or cold applications, and blisters are of great benefit. Cold water may cause the horse to appear pretty well, but knuckling may still remain. Cantharides is perhaps preferable just for a sprain.

Interfering or Striking the fetlock joint while traveling. Shoeing with light shoes will generally relieve it. Get the animal in good condition, etc. Sometimes the striking is not sufficient to bruise the shin to any great extent, but gives rise to contusion, sets up inflammation, the result of which is an extensive exudation, which usually terminates in suppuration; and the matter is deep seated and not very abundant, but from its situation the animal suffers intensely. Such cases sometimes puzzle a young practitioner to tell what is wrong. This may occur from a sprain, but usually from irritation. The animal, when standing, rests the foot, or may lift it from the ground, acting much the same as in suppuration of the foot. Apply hot cloths and poultices, which will allay the inflammatory action or hasten the process of suppuration. Watch it closely, and if, after poulticing for one or two days, the swelling increases and perhaps fluctuates to a slight extent, then you are sure matter is formed; and when it arrives at a certain stage, open it; but be careful in inserting the lancet if there is extensive exudation. First twitch the animal and make a small incision; or sometimes insert a probe or director, and then open slightly. If opened in time, it will often prevent extensive sloughing. Poultice, etc., after opening. If sinuses are formed and matter is discharging, cleanse nicely, and then use caustics, as butter of antimony, nitrate of silver, etc.; or, there may be thickening, which may be removed by iodine ointment, or an occasional blister. Do not apply irritants when the horse has a tendency to brush, so to speak.

Knuckling.—This sometimes falls under the head of disease, and sometimes you can scarcely call it such, and in examining for soundness you may be puzzled to say whether it is sound or unsound. There may be jerking forward of the fetlock at almost every step, or even when standing still. The joints appear prominent in front. It detracts from the symmetrical appearance of the limb, but may not interfere with the action at all. Post mortem often reveals nothing wrong with the joint. It is oftener seen in the hind than the fore limb, hard and fast work being the exciting cause, or working young animals before they are able to undergo such exercise. The high feeding of colts which are kept in the stable is a cause, or it is sometimes the result of more or less disease in the fetlock joint, or the formation of the limb, a straight fore limb and pastern, etc., tend to this.

Treatment.—If of long standing little can be done for it, but if it appears suddenly in a horse three or four years old it may be got rid of. Give rest, apply cold water, and afterwards blister, and if the horse has been in the stable recommend him turned to pasture for a time.

Knee Sprung is similar to knuckling, and interferes but little with the animal's usefulness. It is sometimes the result of formation, and sometimes the result of hard or fast work before the animal is fit for such work, or standing in a stall, especially if such stall slants from before backward. Judges of horses prefer a knee-sprung to a calf-kneed horse, as they will stand more work, and a calf-kneed horse is more liable to stumble. Some say that knee-spring arises from extension of the extensor tendons; others say from contraction of the flexors and ligaments. Another cause is feeding young animals highly, as for show purposes, and not giving regular exercise. High-heeled shoes also have a tendency to produce this. If in a young horse from any of these causes, a little treatment and a little rest may restore it. If in a gross animal, give a certain amount of exercise and then physic; then use judicious counter-irritation; blister. Keeping a horse lower in front than behind has a tendency to help it, but perhaps a level floor is the best. If the formation is faulty you can not bring him to a natural condition. Sometimes it is unsoundness, and sometimes it is not. If it is not from faulty formation, it is not an unsoundness; if it is from faulty formation, it is unsoundness.

Wind Galls will come under your notice almost every day. They are puffy tumors, situated at the back part of the fetlock joint. They are of various sizes, so called because they were supposed to contain air. They consist in an enlargement of the bursæ, in connection with the flexor tendons, where tendons play over each other, or over bones. They are supplied with little sacks, called bursæ; these are lined with synovial membrane, and secrete synovia. The processes of absorption and secretion are going on. When more is secreted than is absorbed, the result is a wind-gall, which is a bursal enlargement, due to the natural secretion, which secretion may become more or less changed if the cause is kept up, and the bursa may become thickened, or even a bony or cartilaginous deposit may occur. You may find wind-galls in any joint, but they are not called wind-galls unless in the region of the fetlock; if well back, it is in connection with the bursæ of the flexor tendons; but if more in front, it is in connection with the joint. A slight wind-gall is not looked upon as an unsoundness, even in a fast horse. In examining, be careful to scrutinize the condition of wind-galls; if they are soft, and there is no heat in the parts, etc., and they are in the back part, and small, it is not unsoundness. In examining, make the animal stand upon the limb; if they are more in front, heat, pain, etc., are present, and there is more or less disease of the fetlock joint. They may appear very suddenly, as after a drive or one day's work. They are due to the excessive demand of the drive; the absorption is not equal to the secretion. I think severe exertion irritates the parts and prevents absorption, and the secretion goes on as natural.

Treatment.—If of long standing, they cannot be removed; but if treated in the early stage, they may be reduced. If suddenly produced in a plethoric animal, give a moderate dose of physic, and use hot or cold applications—cold perhaps is preferable. Pressure is of

great benefit. Take a piece of cloth and fold several times, and place upon the part, and apply a bandage, keeping it wet; it causes absorption; or, you might use refrigerants, as acetate of lead, etc., and sometimes follow with a blister, and put to work gradually. Irritant dressings and firing are not necessary. It is best not to open them unless they contain serum, for the irritation may extend and cause trouble. You could drain it off with a small trochar, but it would accumulate again. If you wish success, treat in the fall of the year, and expose to the cold during the winter; but they will, in most cases, return in the spring. Where they come in front, they are a greater eye-sore, but are the same, and may be treated the same. These may be produced by striking the stall.

Dislocation of the Fetlock.—I will first mention this in the fore extremity. You may be able to reduce it in exceptional cases, but if it occurs in a violent manner, the bones thrown back, the ligaments ruptured, etc., it is worse than a fracture.

Hip Joint.—You may meet with inflammation from some injury, direct or indirect, but generally from indirect injury. It may come from rheumatic inflammation of the joint; the round ligament may be sprained or ruptured. It usually occurs from slipping—just setting the foot upon a cobble-stone and slipping, and the horse be lame for life—or it may result from violent pulling. If the round ligament suffers, there is more or less inflammation set up in the entire articulation. The nutrition of the cartilages may be arrested, and ulceration and anchylosis result. Hip joint disease is not so common as disease of some other articulations, yet it is a favorite seat by some who are not acquainted with the structure of the parts, and you may experience some difficulty in detecting the difference between hip and hock joint lameness.

Symptoms.—If the injury is severe, there is difficulty in extending the limb in walking, and this is better marked in trotting. When walking, he will perhaps flex the hock pretty well. He rests the limb when standing, or it may be lifted up from the ground; but this alone is not conclusive evidence. If there is no irritation in any other parts of the limb, it will assist you in making up your mind. And perhaps he stands on the toe; there may or may not be slight swelling, but after some time you have wasting of the muscles, even if they are not themselves affected, as in spavin, etc. In some cases you are assisted by manipulation; but you can not always rely upon pressure. It is recommended to take a piece of wood and place it over the joint, and strike it with a mallet once or twice, and then walk the animal out and he will go more lame if this is the seat of the disease. But after certain changes take place there is no difficulty in detecting it.

Gluteal Muscles, especially the maximus, which is attached to the prominence on the head of the femur, frequently suffer from injury. This is more common, perhaps, than hip joint disease. It generally occurs just from slipping, more particularly if pulling a heavy load. It is more common in pulling than in ordinary driving horses, and it may be produced in any by slipping or falling violently. If the irritation is kept up, there will be changes in the joint. There may be cartilaginous or osseous deposits.

Symptoms.—There is difficulty in extending the limb—sometimes very great. He can scarcely bring the limb forward at all. There is

more or less swelling, if it is in the muscle; but if in that part in connection with the bone, it will not be so extensive. Looking from behind is the best way to detect the swelling. If you pull the limb back, out or forward, it increases the lameness. You may, in some cases, mistake fracture for sprain, and spavin for fracture; but in fracture there will be descent of the haunch. But the lameness might lead you to suspect fracture. The manner in which the accident occurred also assists you in diagnosing. After a time, when the swelling disappears, atrophy takes place to some extent.

Treatment is just the general treatment of sprains. Give rest, foment, use anodyne and camphorated liniments, or you might apply a blanket wrung out of hot water and cover it with a dry one, or a newly flayed sheepskin, and follow by a blister; blister a large surface, extending around the trochanter major and the articulation—cantharides is as good as anything. Some like the application of a plaster to keep the joint still; slings are sometimes necessary. If caries takes place it is incurable. Keep quiet; if the animal is kept at work there are changes that give rise to a deposit, or a converting of a part of the tendon into cartilage or bone. I think there is no use in firing; some recommend cutting through these large muscles and applying the firing iron near the articulation, but I think it would not be attended with success. Dislocation of this joint seldom occurs in the horse—it is scarcely possible without fracture of the acetabulum—in other animals it does occur; in dogs and cattle it is frequent. Cattle do not have the pubeo-femoral ligament; throwing them is more liable to dislocation. In dislocation the limb is shorter; the prominence is either higher or lower than natural; it may be possible to get it into position in cattle.

Stifle Joint.—There may be sprain of some of the straight ligaments. It generally occurs from slipping, jumping, or from the animal getting fast in the snow, etc., and exerting himself to extricate himself.

Symptoms.—There is difficulty in extending the limb, both in walking and trotting, but it is more marked in trotting, and in extending the limb he endeavors to keep it in a fixed position, and does not bring it so far forward as natural; there may be enlargement and heat in the parts; when standing he flexes the limb to some extent. You must also judge from negative symptoms—look at the hock, fetlock, foot, etc. Professor Dick told his students to examine the foot, although the leg was broken. You can not be too careful in examining.

Treatment.—If it is just a sprain, and is taken in time, it is easily treated. Give rest, foment and blister, or apply seatons, one inside and one outside, as required. I recommend blisters.

Dislocation of the Patella is by no means uncommon, and it it is never knocked to the inside—however, there is nothing impossible—but to the outside. It occurs in many ways, and in some very simple ways, just from a false step in traveling, or even while standing in a stall where there is an abrupt offset in the floor, from stepping off it, or there are things which predispose to it. I have noticed some cases after strangles, which occurred very easily.

Symptoms are very plain, and after seeing one case you can easily recognize the next. The animal cannot extend the limb, and when he

does bring it forward, he does it as though there was no articulation in the limb, and acts the same way when backed. There was a student sent from this college to examine such a case, and there was considerable straw in the box, and he said the horse had got his foot fast in a hole in the floor. The symptoms are much like this, as though the foot was nailed to the floor.

Treatment.—Get it into position as soon as possible, and the best way to do this is to place a soft rope around the foot, and have an assistant pull the leg forward while you take hold of and manipulate the parts. It will generally go in quite easily, and it is possible to do it just by taking the leg in one hand and the parts in the other; but the animal may fall and injure himself, so it is best to have some help, and keep the animal supported, to prevent this; then elevate the hind quarter slightly, or extend the limb, and keep it so, by having it kept there, or tie it to a collar. But I find a better way, and I recommend it: it is a little gentle exercise upon a smooth place; and in turning, it is perhaps best to turn to the side from the injured limb. If the muscles have lost their power of contraction, a little exercise brings them in tone. Invariably advise this, after perhaps bathing with a little cold water and rubbing well. But you may meet with a case where the muscles are relaxed, until it is necessary to stimulate with some stimlating liniment, or even a blister.

Partial Dislocation is where it just slips slightly, impairing the action to some extent; and I think this usualty occurs in very young animals, and is due to weakness or certain exciting causes, as allowing weakly colts to run on a rough hill-side. This is likely to become habitual. Changes take place in the cartilages, and perhaps a porcelaneous deposit occcurs. It usually occurs in colts up to fifteen months old, and may affect one or both limbs. There is slight difficulty in extending the limb, and there is a peculiar clinking sound at every step, which you can hear for some distance, and a peculiar stilty action.

Treatment.—Feed well; stimulate the joint, and after giving a certain amount of exercise, blister; keep it in a nice level box. You will often find the result is distention of the bursæ, which, although it does not seem lame, is a great eye-sore. Sometimes there is a tendency to go upon the toe. When heels grow very long, and it is necessary to bring the foot into position and apply a stifle shoe, apply it to the affected limb, and not, as originally applied, to the sound limb, to cause the weight to be thrown upon the affected limb. There is a little projecting piece to the toe of such a shoe.

Semi-lunar Cartilages Become Injured.—This is very troublesome, and generally gives rise to permanent lameness. The lameness is similar to other diseases of the joint—difficulty in bringing the leg forward; wasting of the muscles; some swelling appears, at first soft, but gets harder and harder, and a sort of cartilaginous deposit is the result. It is generally hopeless, but you might try counter-irritation.

Vastus Muscles are also sprained, and in just about the same way as sprain in the stifle joint; there is great difficulty in extending the limb, as great almost as in disease of the patella. These symptoms disappear, and then wasting takes place; the animal drops to a

certain extent. It is easily detected by one acquainted with the parts.

Treatment.—Use counter-irritation. I have seen pretty good recovery take place, but sometimes this muscle wastes from azoturia. From this wasting a hollow sometimes extends from the upper to the lower part of the femur, and if there is no disease of the bone or at the attachment of the muscles to the bone, a tolerably good cure may be effected.

Psoæ Muscles are injured and it is difficult to diagnose. Azoturia is sometimes mistaken for a sprain of these muscles (and I believe they are generally implicated in azoturia). There may be constitutional disturbance, and if you can not detect otherwise, you may examine *per rectum*, and you may detect enlargement. Give rest, apply heat over the loins, etc.

Muscles Between the Stifle and Hock.—The flexor metatarsi, if sprained, gives rise to very peculiar symptoms. The injury may be to the belly, the origin, or insertion, but in most cases it is the belly. It may occur in various ways—from running, jumping, etc.

Symptoms.—If in the belly of the muscle, more or less inflammation is the result; it loses the power of contraction, and, it being an important muscle, the muscles of the opposite side contract forcibly, and in attempting to move the limb, causes it to hang in a dangling manner, and a person not acquainted with the structure would say that the leg was broken. If the leg is straightened it can bear some weight. You can see a cut of this in Prof. Williams' work. Just think of the action of the muscles, and you will have but little difficulty in diagnosing this. It looks very serious to a person not acquainted with the anatomy of the parts, but if the insertion or origin is not injured there are good prospects of recovery, if properly treated.

Treatment.—Give rest, keep in a box stall, and allow him to move the limb to some extent. It is not necessary to use slings; use fomentations and stimulating liniments, and perhaps a mild blister, and, after the limb is getting better, give gentle exercise, if the animal will take it. If the animal is gross, give a dose of physic. If the muscle is injured at its origin or insertion, there will be swelling in the parts, but the symptoms are the same. Injuries to the other muscles in this region of the extremity will give rise to symptoms somewhat similar—dangling of the limb, etc.

Hock Joint.—Diseases of this joint are numerous. A majority of cases of lameness in the hind extremity are in the hock. It is oftener affected than any other articulation.

Bog Spavin is a soft, puffy tumor, situated at the anterio-internal part of the true hock joint, and is due to the distention of the capsular ligament with synovia. It bulges out where it is not bound down by tendons. It is called bog spavin because it is a soft, while bone spavin is a hard, condition of the hock. It is very common and serious, and attacks heavy horses most frequently, and in such is not so serious. It is comparatively rare in road horses. It is more serious than wind galls, from its affecting the true hock joint. It is the result of an extra secretion of synovia. Naturally there are about two or three drachms of synovia in this sack, but in bog spavin it may be two or three ounces. As well as distention, there may be more or less

irritation. The capsular ligament in some cases becomes thickened, and if of long standing, or if the cause is kept up, the cartilages become affected—perhaps destroyed—and a porcelaneous deposit is the result. But in many cases it will remain in just the same distended condition for some length of time, and then these changes take place, and perhaps caries, anchylosis, etc.

Causes are predisposing and exciting. Horses having round, fleshy limbs, etc., are predisposed. Want of regular exercise, feeding colts for show purposes, fast work, sprain of the articulation, etc., are exciting causes. It may, like wind-galls, appear very quickly.

Symptoms are very plain. A puffy tumor, as described, involving the capsular ligament; but there may be a puffy tumor, and not be a bog spavin, but just a bursal enlargement. If there is much irritation, there will be heat and pain, and perhaps lameness, which will continue as long as the irritation exists. It is even more troublesome to treat than bone spavin.

Treatment.—If in a young horse, and there is no lameness, and you are informed it has been suddenly produced, if in an animal in good condition, reduce the condition by limiting the food; apply hot or cold bandage judiciously; and you may find benefit from a combined bog spavin and thoroughpin truss, but it is difficult to get it upon a bog spavin, and it is a little difficult to bandage the hock; and you must always leave the os-calcis free. Use judicious counter-irritation, and the fall of the year is the best time to treat, for cold has a good effect. If those changes are going on which are the result of inflammation, then blister. Puncturing is not attended with success, for the fluid will soon form again.

Thoroughpin is found in most all well marked cases of bog spavin. This is a soft and compressible tumor in connection with the bursæ of the flex or pedis perforans tendon. It is so called because it runs through from side to side.

Pathology.—It consists in distention of the bursa in connection with the flexor pedis perforans tendon, above and in front of the os calcis. It is generally caused by more or less irritation, causing extra secretion of the fluid in the bursa, and may be due to irritation set up through bog spavin; and in a majority of cases of bog spavin you will find thoroughpin exists, due to the capsular ligament being bulged upward and pressing upon the bursa of said tendon; but the same cause might produce both.

Causes.—It is most frequent in heavy horses. It may attain a considerable size, and does not often produce lameness, unless irritation is set up; a long, straight hock, especially in a heavy horse, predisposes to it. It is comparatively rare, but is more common in light horses.

Treatment is about the same as in wind-galls. Rest the animal to a certain extent; use hot or cold applications—cold preferable; counter-irritation, and in some cases puncture, but the more seldom you puncture the better; but if there is serum or pus, then puncture. If you treat such a case, it is better to treat it in the fall of the year; you may reduce it. I have known it reduced, and it never was noticed afterward. There is no specific for it, but just use those remedies that will tend to cause absorption. You may derive benefit from diuretics.

Near the side of the os-calcis there is a groove, through which the

tendons of the flexor pedis performs, play and sprain frequently occur, and various names are applied. It is called

Spring Hock, but perhaps a better name is sprain of the tendon. A sprain here, even of a slight character, is apt to be attended with serious results, and is most likely to occur in horses used for fast work, especially if there is a heavy weight upon the back.

Symptoms.—There is difficulty in extending and flexing the limb; swelling; and pressure causes pain; the heel lifted from the ground; there may be constitutional fever, and if so, intense pain. It requires a great amount of rest to effect a cure. Hot applications, I think, are preferable to cold. Apply bandages; a high shoe is good, as it tends to take the strain off the muscle. A good way to apply heat is to take a large sack, and slip it over the foot and up around the part, and stuff it with hot bran. If in a cold stable in cold weather it is preferable to poultice, etc., after a time. Repeated blisters, or a seaton in some cases, might be useful. An abscess may be the result—extensive swelling, pain and fluctuation—then open, apply poultices, etc., and after the irritation goes down, blister. This is rather a serious affection.

Below the Hock.—Injuries here are about the as in the fore limb, but the tendons are not so liable to be cut, but they may be cut, and a portion of the tendon be removed, and a tolerably good recovery be effected.

Capped Hock.—This is a common and not a serious occurrence. It is produced by injuries to the tuberosity of the os-calcis. It is a little swelling upon the point of the hock. The gastrocnemius internus winds around the externus and forms the cap of the hock, and in this place there is a large synovial bursa; there is also a bursa situated between this and the skin, and injuries to these give rise to capped hocks.

Causes.—External injury, as kicking, etc, are common causes. Some animals have a habit of kicking in the stall. It may be caused by being cast in the stall or box, and some will do it in a nice loose box, perhaps from the manner in which they lie down, or by standing near and rubbing against the side of the stall. Another cause is from influenza or strangles; from debility and slight dropsical tendency, but it soon disappears if from this cause, when the animal gets stronger and is exercised. It may come in plethoric or gross animals, or from some derangement of the system. It is easily produced—it may be produced in one night. It is easily detected. There is a swelling in the part, and, although not serious, it is an eyesore. It rarely interferes with an animal's usefulness. Endeavor to find whether it was suddenly produced or not. If it is between the skin and tendons, there may be a slight exudation, heat, etc., in the parts; but the symptoms are more severe when the synovial bursa is affected. It is generally violently produced. It extends to the sides of the os-calcis; there is heat and pain, and the animal will go stiff and perhaps lame.

Treatment.—Remove the cause. If a kicking horse, place him where he cannot injure himself, and you may have to pad the stall, and if you are called, at first, to a case suddenly produced, give a good dose of purgative medicine if the horse is in good condition. If there is any irritation, foment, then apply cold; and hand-rubbing tends to

stimulate the parts and produce absorption of the fluids; use the ordinary liniments and blister; and there are exceptional cases where you may insert a seaton or open. Where it is violently produced, and serum is formed, you might use the aspirator, or knife, if in the bursæ mucosæ. You will find benefit from iodine or anything that stimulates absorption. It is difficult to remove. Do not be led into puncturing too freely, although it is sometimes very tempting. Tincture of cantharides is of benefit in many cases.

Curb is an enlargement at the back part of the hind leg, a little below the hock, due to sprain or complete rupture of the calcaneo-cuboid ligament, or, some say to irritation of the sheath of the tendon; but in most cases it is sprain of the ligament.

Causes are predisposing and exciting. Certain breeds are more liable than others; also, a faulty conformation; long os-calcis, inclining forward, instead of backward, gives rise to what is known as a curby hock. The exciting causes are hard and fast work. It is most common in fast horses. It is often produced in winter by being driven in deep snow; or, forcibly backing an animal with a heavy load.

Symptoms.—This is easily detected by viewing from the side. It generally produces lameness, but not of a permanet character, and is not so serious as sprain; the parts are hot and tender, and there is enlargement; when standing, he flexes the limb. If the horse stands for a day or two, the lameness usually disappears, but returns if used, while there are other injuries in which the reverse is the case. In almost all cases where it is suddenly produced there has been a predisposing tendency. Although curb is said to occur on the back of the leg, a little below the hock, it varies to a slight extent. It generally occurs in young animals, and is more serious than in older ones. It is sometimes called soft curb, when there is a bursal enlargement with it. It is likely to be associated with more or less irritation. It will be a long time before such an animal will be fit to do much work, and treatment has but little effect. If it is low down, the animal will stand upon the toe; will be more or less lame—sometimes extremely lame. But this soon disappears in an ordinary case, but comes back when put to work.

Treatment.—It can generally be successfully treated without any blemish; treat just the same as sprain of any ligament or tendon. It is well to give rest; however, you cannot always do this; but if in a very valuable horse, give rest; foment when there is pain; use anodyne applications, and in most cases follow by a blister, which has an excellent effect in getting rid of the irritation; cantharides is perhaps preferable to mercury; clip the hair and then rub it in pretty well for ten or fifteen minutes; leave on for a day or two, and then wash; shoe with a shoe a little higher at the heel than at the toe; it tends to take the strain off the part. You may have recourse to the firing iron, but I am no great advocate of firing for curb. Caustics are sometimes applied, which destroy the hair bulbs and produce a worse blemish than the curb. Irritation in the articulation may call for firing. If you are called to treat a horse that is in training, two or three years old, perhaps there are thousands of dollars at stake, and the owner wants him ready for the engagement; perhaps you can, by the judicious use of cold water and anodyne liniments, get him ready; however, the proper treatment would be to rest, physic, foment, blister, etc.; but if there are several thousand dollars at stake, it makes a

difference in the case. Use cold water with acetate of lead, powdered opium, etc.

Inflammation, or Sprain of the Hock.—Perhaps there are well marked symptoms, or it may be that some of the little ligaments are injured and no plain symptoms present, but the animal does not flex the hock so nicely as natural, or perhaps he lifts the foot from the ground. Manipulation will assist you in diagnosing this. Give rest, foment, and in some cases blister.

Open Joint in the Hock is a very serious injury, and if produced in a violent manner, from a kick, etc., the chances are that it will result in anchylosis, if it does not destroy the animal by the constitutional fever. There is intense pain, the foot lifted from the ground, the soft tissues swollen, and you are told that the animal received a kick in that region. It is likely that anchylosis will be the result. The same applies to open joint in the stifle, and if it occurs to a horse not worth more than eighty or one hundred dollars, it is generally best to recommend his destruction. Sometimes it looks much like open joint when the capsular ligament is not ruptured.

Bursal Enlargements, just little puffy tumors. In any region where there are tendons and prominences of bone, there are little bursæ, and these may be enlarged both inside and outside of the hock, but they rarely interfere with the animal's usefulness. Treat the same as wind galls.

Gastrocnemius Internus is liable to slip out of its place, where it passes over the joint of the hock, and it is very difficult to get it into its place, but nature accommodates itself to the changed condition of the parts. It is of course best to get it in its place, but if you cannot, then allay the irritation until nature accommodates itself to the change.

Ulceration of the Tibia.—I saw a case; the animal became suddenly lame from being ridden hard once or twice; was laid up and treated with the ordinary applications; got better, but afterwards died from congestion of the lungs. There are just about the same injuries below the hock as are met with in the fore extremity, but sprain is more frequent in the hind limb, and break-down more frequent in the fore leg.

LAMINITIS.

Laminitis signifies inflammation of the sensitive laminæ, and is, perhaps, not a good term, as there are other structures than the laminæ involved, and, in a well-marked and severe case, the whole sensitive structures are involved—the bone, ligaments, etc. Another name is founder—a name, perhaps, applied from the peculiar manner in which the animal progresses. When it terminates quickly in resolution, then it is principally in connection with the sensitive laminæ structures. It occurs in the acute, sub-acute and chronic forms. It is serious and, perhaps, one of the most painful diseases to which the

horse is subject, as the parts are extremely sensitive, and are largely supplied with blood and nerves, and enclosed in the hard and resisting hoof, which adds to the severity of the irritation, and in inflammation of these parts, the same changes take place, to a certain extent, as in other parts; but swelling can only take place to a moderate extent, making it more severe. But suppuration of the sensitive laminæ takes place, and often necrosis of the bone.

Causes.—Some are said to be predisposed—some breeds, and those having weak feet—but it may occur in any kind of feet, and, in an acute attack, in a good strong foot it is apt to be more severe than in a worse foot. Hard and fast work are exciting causes. It may be produced easily, and is more common in the hot months of summer. Shoeing is put down as a cause, and perhaps it is in some cases. If the shoe bears upon one part of the foot, it may set up irritation. This may spread and involve the sensitive laminæ. Any irritation of the stomach and intestines is liable to be followed by laminitis, because there is a similarity of structure in the laminæ, skin and mucous membranes, and irritation in any of these, especially the stomach, is liable to extend and involve the feet. Some feeds are more likely to produce it than others; even a small amount of wheat, just sufficient to set up slight colicky pains; these pass off and the animal is attacked with laminitis. And the same may occur from irritation of any mucous membrane. The irritation of parturition sometimes causes it. An ordinary dose of physic may produce it. Some call this metastasis; that is, that when inflammation attacks one part, it is liable to fly from that and attack some other; but I think this is incorrect. Laminitis may be easily produced by driving an animal eight or nine miles on a hot summer day, and then put in a stable where the perspiration is suddenly checked by a draft, etc.

Symptoms.—It is easily detected if in the acute form. There is fever, and a quick, full, bounding pulse, fifty, sixty, or seventy beats per minute, and perhaps sweats bedew the body, and it may remain in this condition for some time. The horse is stiff and moves with the greatest difficulty; the constitutional symptoms are violent, and you might think he was suffering from disease of some internal organ; especially if his wind is affected in any way, you might think he was suffering from some disease of the respiratory organs; after seeing one case you should easily recognize the next. The horse generally retains the standing posture, but sometimes lies down. These symptoms may be present in other diseases, but if you attempt to back him then the true character of the disease shows itself. He throws his weight upon the heels to relieve the toe, and if you attempt to push him back he drags the feet; there will be heat around the coronet and a throbbing of the plantar arteries. If it is only in the fore feet, as is generally the case, he walks in a peculiar manner, throws his weight upon the hind limbs by putting them well under him, and goes in a kind of jumping manner, keeping the weight upon the frog. A casual observer might think it was inflammation of the lungs or kidneys. When both fore and hind feet are affected, the symptoms differ; he will endeavor to throw weight upon the hind feet, although they are affected. He will stand with the feet close together, and when the weight is thrown upon one foot it is jerked up quickly, almost as if suffering from some nervous disease. Sometimes it is produced in only one foot, and when so it is generally from some well marked cause. It is likely to follow some injury to the foot, in

which he cannot mark the limb, and stands upon the sound one, and it not infrequently brings on laminitis in the sound limb, as well as ringbone, spavin, etc. In such cases watch the sound limb carefully. If it occurs in both hind feet only, it is likely it was brought on by driving on hard roads without shoes. If it comes from the stomach, it is likely to attack the fore feet, or both fore and hind feet. In a majority of cases produced in the ordinary way, when it affects only the sensitive structures, the sensitive laminæ, sole and frog, it terminates in resolution, but when the exciting cause has been of a severe character, great changes take place. The inflammation then involves the other structures, causes separation of the sensitive and insensitive laminæ, and descent of the coffin bone, making the sole convex and giving rise to what is known as pomiced foot, or the bone may descend right through the sole, and the hoof will grow out of all shape. A mild attack may produce all this if the exciting cause is kept up, or when you are not able to relieve the irritation.

Treatment.—Although serious, it is, in many cases, satisfactorily treated. The constitutional symptoms are generally best relieved by sedatives and purgatives; but it is sometimes the result of super-purgation; then do not give a purgative. In just an ordinary case, remove the shoes, and have the wall rasped down nicely, but not to too great an extent, and then envelope the foot in poultices, hot being perhaps preferable; and give a dose of purgative medicine; and I give larger doses than are recommended in our works, and as soon as it begins to act the symptoms become less violent; but you must regulate your dose according to the size, age and condition of the animal. Give injections of soap and water; also, give a good sedative—Flemming's tincture of aconite, fifteen or twenty drops every two or three hours, until relief is obtained. In some cases you may take some blood, and it is a good thing in many cases. As to whether it should be local or constitutional, there is difference of opinion. I think it is just as good to take it from the jugular vein as any. Some bleed from the toe, but it is liable to cause irritation. When you do bleed do not give so much purgative medicine; give nitrate of potash freely. Some say, and I believe, it can be checked by the free use of nitrate of potash. Give two or three drachms two or three times a day; give it in water, and allow plenty of water—not much at a time, but give it often until the physic begins to act, and then be careful with it for some time, and when the animal begins to get better, do not push medicine too far. When there are no signs of relief, you may expect that exudation is taking place, and it may be advisable to make an opening at the toe and let it out, and if this is done in due time it may prevent descent of the coffin bone; but if in about three days the animal is relieved, and moves tolerably well, a little exercise is beneficial, and perhaps it is well to again apply the shoe. If the animal retains the standing posture, it is good practice to lay him down; some recommend slings, but I think it is better to lay him down, which is easily done. Tie up one fore leg, and attempt to move him, and you can easily lay him over, and in most cases he will lie quite well if the symptoms are relieved in three or four days. The former shoes will do to be put on, but those without heels or toes are best. There is a kind noticed in Williams' works; it is a bar-shoe, very thin at the heel, but I do not recommend it in the early stage of the disease. A horse that has suffered from this

should be carefully used for some time; if he is put to work too soon it is apt to assume a sub-acute form. If you have treated an acute case, which has done well, but there remains some heat, a good cantharides blister around the corona is of benefit.

Laminitis, Sub-acute and Chronic.—This may occur in any horse, but is most common in aged horses. The symptoms are not so prominent as in the acute form. It comes on gradually, and, like other diseases of the feet, the great exciting cause is hard work—especially irregular work. But it may be from faulty shoeing, which sets up irritation, which extends and involves the laminæ. Soft, brittle and small feet are more liable; that is, if the feet are out of proportion to the size of the animal—a small horse should have a small foot. Another cause is standing in the stable or on board of ships. Those horses that are imported frequently suffer from this.

Symptoms.—There is heat in the foot; he walks with a kind of stumbling action; the laminæ are likely to lose their attachment, then the animal throws its weight upon the heels, throws the limb up in a peculiar manner, and tries to bring the heel down first. It may terminate in pumiced foot, even when the animal showed in great pain, and perhaps worked all the time; yet considerable changes may have taken place. The foot may have been slightly tender, but no well-marked lameness, and if it continues for any great length of time the treatment is tedious and not very satisfactory—not so satisfactory as in the acute form. The shoe, in most cases, should be removed; rasp the wall down at the heels, and it may be advisable to take off some of the sole in some cases. Then apply poultices, or keep the animal standing in a water-bath; use moistened clay, etc. Cow-dung is recommended, but is very injurious, but it might be used with three or four parts of clay, and kept moistened, but I do not recommend it. Give a laxative; do not keep the shoes off too long, and in some cases it is not advisable to keep them off at all. If the sole is very thin, it may be necessary to keep the shoes on. After the heat and tenderness is removed, then use a bar shoe—a shoe thinner at the heel than at the toe. If the irritation continues then blister around the corona, and well up toward the fetlock, and use such an animal carefully. If it is a valuable animal, and in the spring of the year, turning out in a soft moist pasture is of great benefit. Such an animal is not usually valuable for fast work, but may be valuable for slow work. Another symptom is wasting of the muscles of the limb and chest, giving rise to the so-called chest-founder. However, there is no such disease. The result of laminitis is

Pumiced Foot.—This is not a very good name, but it is difficult to change the name of some diseases. It is a name applied to the condition of the foot where the sole becomes convex, due to descent of the coffin bone. But there are certain conditions seen, especially in a flat foot, where the walls have been cut down, etc., where the sole is convex and not due to laminitis, but to faulty shoeing. In this case there will not be the effort to throw the weight upon the heel. In pumiced foot the descent is toward the toe of the frog, and the wall is thinnest there—so thin it can be easily cut through into the sensitive part. Pumiced foot is easily detected by the unnatural convexity of the sole. This may occur in either the fore or hind feet. If in the hind feet, it is generally the result of a severe attack of laminitis, and the bone may descend through the sole. If there is

irritation, endeavor to allay it by the ordinary means—poulticing, water-baths, etc.—then apply a nice-fitting bar or concave seated shoe; then a blister around the corona; and a run at pasture is of great benefit. A horse that has been so affected is not serviceable for fast work, but may do upon a farm.

Villitis is inflammation of the secreting villi, and

Coronitis is inflammation of the corona. The causes, symptoms and treatment are the same as in laminitis.

CORNS, Etc.

Corns are generally found in the fore foot, but may possibly come on the hind foot, and are oftenest found on the inside of the heel, because it is rather weaker, and the animal throws more weight upon the inside. They are brought on and aggravated by pressure; they are brought on by the same cause, but are of a different character from those in man. In the horse it is simply a bruise of the sensitive sole, in the angle between the bars and wall, giving rise to extravasation of blood into the horny sole. A change may take place and an imperfect growth of horn result, if the cause is kept up. There are soft, hard, and suppurating corns; these are just different stages of the disease. If it is a soft corn it is perhaps of long standing. Horses with weak and flat heels are more liable, but it is quite possible for it to occur in any foot, and if in a strong foot it is more severe and more difficult to treat than if in a poor foot.

Causes—Are shoeing and hard work. Shoeing with a seated shoe is a prolific cause. Such a shoe bears upon the heel- the weakest part of the foot—more than any other. The shoe should be made narrow at the heel—paring the foot unnaturally at the heel causes it.

Symptoms.—The horse is more or less lame in most cases, and is generally most lame when the bruise is first produced. There is a tendency to point the foot if only one is affected, if both are affected he shifts from one to the other. He can go pretty well upon soft ground, but hard roads or weight upon the back increase the pain. Take up the foot and tap it with a hammer, and it causes pain. The lameness is great if suppuration has taken place. He knuckles at the fetlock, and this may mislead you. You may see redness just by cleaning under the shoe, or you may take it off. An animal may be lame from a corn, and not show any redness. Just riding a horse three or four miles may produce corns if he is not properly shod, and suppuration may take place quickly.

Treatment.—In many cases it is not necessary to lay the horse off work, especially if used at slow work. Remove the shoe, cut the heel down to a certain extent, and sometimes the sole, but not into the quick, unless there is suppuration; and if he is to work, apply a shoe that will prevent pressure—sometimes just the ordinary shoe. A bar shoe, in most cases, is preferable. Keep it on for two or three weeks, so as to throw the weight upon the frog—something like the Good Enough shoes, or that recommended by Prof. Williams. I believe that if horses were shod with shorter shoes, and care taken to take

the pressure off the heels, corns would not be so common. If there is much irritation, allay it by poulticing, cold water, etc., and if it is suppurated, cut down and let the matter out, for if you do not, it will make its way to the top of the hoof, and cause quitter. After the irritation has been allayed for some time, then blister around the coronet. Corns are considered an unsoundness, which greatly depreciates the value, and may be overlooked in examining for soundness, especially in a strong foot. You may have to cut considerably before you come to the extravasation, which may be very slight, yet sufficient to cause lameness.

Thrush is an irritation in connection with the frog, giving rise to a purulent and offensive discharge, which is characteristic of thrush. It is oftenest seen in the hind feet, and is due to a slightly diseased state of the venter surface of the frog, particularly in connection with the cleft. It gives rise to irritation, spreads, impairs the secretion, and gives rise to this discharge.

Causes.—There are extrinsic and intrinsic causes. It is sometimes seen in the fore feet in navicular disease. Any irritation of the foot may produce it. The extrinsic cause is wet and filth, allowing dung to accumulate, irritating the parts, etc. Heavy horses are more disposed to thrush, canker, cracked heels, etc. Thrush is not so prevalent in a cold climate.

Symptoms are plain. The horse does not actually go lame, but goes tender, and if he steps upon something hard, he will flinch; and there is a discharge of a peculiar odor, etc.

Treatment.—It is easily treated. If due to ordinary exciting causes, as filth, etc., remove the cause. In some cases take off the shoes and pare down the parts—remove any detached parts—and immerse the foot in a bucket full of water. Use astringent dressings—the carbolic lotion, one part of acid to eight, ten or twelve of water, or chloride of zinc five or ten grains to an ounce of water—and apply well into the cleft, and then apply some tow or cotton saturated with tar. There are other remedies, one is dusting the parts with powdered calomel; pressure is useful after these. Where horses get frog pressure thrush is not so common. Thrush may terminate in canker, but it is the exception and not the rule. Use sulphate of copper, butter of antimony solution, and the tincture of chloride of iron. A change of dressings is of benefit in most chronic cases.

PUNCTURES AND PRICKS.

Punctures from a nail passing through the sole, etc., may or may not be serious, according to depth and direction. If a puncture is in the frog, near the navicular bursæ, it is liable to be severe, for it may injure the tendon, or even the os pedis. When so, the whole limb may swell and become gangrenous. If it passes in the frog, and its course is to come out above the frog, it is not very severe. Sometimes it only just penetrates the sensitive structures, and the animal is not lame, but a little tender, in which case you have difficulty in diagnosing—and some of the greatest mistakes that are made by a veterinary sur-

geon are in diagnosing lameness. You may imagine there is lameness and heat in the hock, and perhaps there is heat there from the irritation in the foot.

Symptoms.—If it is in the hind foot, the animal knuckles; if in the fore foot, it is pointed, and when weight is thrown upon the affected foot the other is quickly brought forward. Examine carefully; take up the foot and tap it with a hammer, and he will generally evince pain; and he may show pain when you tap upon the side opposite the injury, and not show it when you tap upon the injured side. The horse will perhaps knuckle just when starting, for a few steps, and then walk all right. If in the frog, and you cut off some of the soft part, there may appear a small dark speck; tap up on this and it causes pain, then it likely is a puncture.

Treatment.—It was at one time recommended, although not much lame, to cut the sole down and immerse the foot in poultices; but there is generally no necessity for cutting much, but put the animal off work for a few days and apply a poultice. But sometimes the irritation increases instead of subsiding. Then it is necessary to cut down thoroughly, and let the matter escape; if you do not it will extend and produce quittor. In some cases of puncture the whole of the sensitive and insensitive frogs become detached. Then you must remove the frog, for a new frog has to be produced. The after treatment is to poultice, use mild astringents, etc. Sometimes a fungus growth results, which, in some cases, is very difficult to remove. You may have to use the knife, hot irons or caustics. Suppuration, in some cases, is pretty severe, and in other cases is the better termination. If it is in the region of the navicular bursæ, and not followed by suppuration, the inflammation may continue and prove more difficult than suppuration, or the sole may be under-run from a puncture, which did not give rise to suppuration. Then use the knife pretty freely, for if you do not, the new sole grows, the old presses upon it and keeps up the irritation. In cutting in a puncture do it carefully, and do not wound the healthy tissues. There may be irritation and not suppuration, and if you cut down carefully the irritation may subside.

Pricks.—This injury results from shoeing. It may or may not be the result of carelessness. It may result from very thin walls, or from the use of improper nails. The symptoms are about the same as in punctures, but the nail may have been driven into the quick, and then drawn out, and driven again. In such a case, if the animal is kept quiet for a day or two, there will not generally be any bad results; but if worked, irritation is set up, lameness, etc.; or, perhaps a nail is driven very near, but not touching the sensitive parts, the animal may go well for some time, then strike a stone, the concussion irritates, and suppuration results, and causes great lameness. Remove the nail, and if matter is formed, let it out; after the irritation subsides, put on the shoe; use a little tow and tar, or a leather sole.

CANKER, SAND-CRACK, ETC.

Canker.—This is of an inveterate character. It is more common in heavy horses. It is a fungus growth. It may involve part or all of the sole and frog.

Causes.—Perhaps from sulphuretted hydrogen diathesis, or constitutional diathesis. It may be produced by irritation, as puncture, and may supervene a slight attack of grease. An exciting cause is standing filth, dung, urine, wet farm yards, etc.

Symptoms.—A fungus growth appears; the horse is lame; the sole becomes absorbed to a certain extent, and this growth extends and may involve the whole sole and frog. It is very vascular, and bleeds readily. It is difficult to treat, if due to a diseased condition of the parts.

Treatment.—It is necessary to use the knife freely, and remove all the horn in connection with it, or cut and then use caustics. Nitric acid is as good as any caustic for this. Then apply pressure by means of a piece of brass, iron, wood, etc., extending between the sides of the shoe; or, if the horse is not extremely lame, a little exercise may give sufficient pressure. Cover the injured parts with tow and tar. Sulphate of copper, chloride of antimony and nitrate of silver are used as caustics. Prof. Dick's remedy was sulphuric acid, two drachms; verdigris, two drachms, and sufficient amount of tar. Prof. Williams says to remove the whole sole, even in an ordinary case (I would not recommend this unless the greater part of the sole is impaired), and then use chromic acid, covered with tar and tow. To treat this requires patience and perseverance, and you may subdue the fungus growths and produce a healthy growth.

Sand Cracks, or Quarter Cracks.—Called quarter perhaps because the quarter is most likely to be affected. The crack extends down the wall, parallel with its fibers. It is called sand cracks, because it is common in horses kept upon hot sandy soil—a horse raised upon moist land has a larger and flatter foot than those raised on dry land. Sand crack is oftenest seen on the inside quarter of the fore foot, and in front of the hind foot, but may appear on any part.

Causes.—Some breeds and certain usage predispose to it, and shoeing with high heels and toes, high condition and irregular exercise, dry weather, etc., before the crack makes its appearance. I think there is impaired secretion and a slight irritation, but it may appear in a healthy foot. At first it is generally just a small crack at the top of the hoof, and extends into the sensitive parts, or it may only extend through the horny part and not into the sensitive parts. The crack contracts when stepped upon, and expands when raised. This bruises the sensitive parts, and causes irritation, inflammation, and suppuration, and, if the animal is still kept at work, severe consequences may result. The hoof will not reunite, but must grow from the top, and takes a long time. It is, generally speaking, unsoundness, but if properly used it does not interfere much with his usefulness.

Treatment.—When lame remove the shoe. Cut down the wall immediately under the crack, then allay the irritation. Bathe or immerse in warm poultices, etc., then endeavor to promote the growth of horn—a blister around the coronet stimulates the growth—and when it grows down about an inch then a little exercise is beneficial. Cold water is also a stimulant for the growth of horn. If the horse must work, cut down the parts; and endeavor to keep the sides of the crack together by means of clamps, using the necessary hot iron to give a hold, and if in a strong hoof there is but little trouble—in thin

walls you might wound the sensitive structures—or, a nail may be inserted in the form of a clinch in a heavy hoof, or a brass plate put on with screws. The firing iron is often used, and is sometimes beneficial. If the crack extends half way down, then you must bottom the crack, as it is called, then fire in a sort of a V shave to weaken the attachment. Some strip off the horn entirely, and allow new horn to grow. Shoe with long shoes, and give frog pressure. The cold of winter as well as the heat of summer predisposes to it. In examining for soundness it is generally easily detected, but if the hair is long it may be overlooked, and some honest (?) people fill the cracks with gutta percha. A bar or round shoe is a good kind of shoe for sand crack.

Tread, Over-reach and Calk are common in winter, especially when high, sharp shoes are used. Even if very trivial, and neglected, they may prove very serious.

Treatment.—If it penetrates some little distance, the horse is kept at work and suppuration results. The animal will be very lame; tapping slightly gives pain. It is sometimes advisable to remove the shoe; cleanse the parts; rasp the wall down; cut down carefully; remove any hair, etc. Then apply a nice light poultice, and then astringents. If not attended to the matter burrows and it becomes a serious trouble, and may even result in a quittor. Do not use any powerful remedies. Equal parts of oil of tar, tincture of benzoin and linseed oil is a good application. The lateral cartilages may be cut in over-reach, and if so, it takes a long time to recover. Bring the parts together, if there are any chances for reunion, but if not, then remove the detached parts; use luke-warm water, astringents, etc., and if any little growths spring up, subdue them by the usual means. If there is great pain use an anodyne—opium and water, or even chloroform. Sometimes, after the irritation, a new growth of horn commences, and takes a long time for it to grow out, and, perhaps, when it extends about one-third way down it comes in contact with the old, and irritates it. This is more serious right in front. The result of all these injuries may be quittor.

INJURIES AND DISEASES OF THE FEET.

The Feet.—In injuries to the feet, from calks, etc., there is sometimes profuse hemorrhage, and the best way to arrest it is by pressure. The surgical way would be to take up and ligature the artery; but this is difficult to do, and it is tolerably easily arrested by pressure and styptics, as the tincture of the chloride of iron, acetate of lead, and perhaps a tourniquet will be needed. Apply pads over the arteries and then bandage, and keep up the pressure for twenty-four or thirty hours if the hemorrhage is profuse. The hemorrhage may weaken the animal, but there is no great danger of fatal hemorrhage, although there are exceptional cases.

Quittor is a fistulous opening between the sensitive and insensitive laminæ, and may result from the various injuries to the feet, as punctures, bruises, pricks, corns, treads, etc., which end in suppuration,

and the matter does not get a dependent opening; it extends, destroys the tissues with which it comes in contact, and finally bursts and forms a sinus at the head of the hoof. A swelling first appears at the top of the hoof, which is hard and painful, and then bursts. Is is more serious in a heavy horse and in the hind foot. It may extend around the greater part, or entirely around the coronary band, forming a series of abscesses and finally sinuses.

Treatment should be energetic and careful. Look carefully and endeavor to find the original cause. Generally take off the shoe; cut down the sole and wall immediately below the abscess or sinus. If from a corn, and the sinuses are not formed, this treatment may arrest the irritation. If it is from a corn, or injury to the parts below, treating a little abscess at the head of the hoof is not always successful, but use the knife and rasp pretty freely, and if sinuses extend down, follow their course. Endeavor to remove the wall and allow the matter to escape; and the bone may be injured, when it is very serious, but the symptoms are just the same. Cut down and expose the bone, and touch with hydro-chloric acid, or scrape it. Necrosis of the os pedis may result from quittor. After laying the sinuses open, inject with corrosive sublimate, one ounce; alcohol, one ounce; and water, one ounce. Inject every day for three or four days. This causes sloughing and brings on a healthy action. Caustics have been recommended, just the same as for fistula or poll-evil, and in some cases it is good practice to use them. When there is difficulty in opening up, you may take a few grains of corrosive sublimate, roll it up in tissue paper, and insert to the bottom of the sinus. Sloughing will take place in three or four days, and a healthy action results. It requires dressing every or every other day. Prof. Williams refers to a treatment which was a secret, but he thinks it was the tincture of the chloride of iron which was used. After you arrest the discharge, and some tenderness remains, then a blister is of benefit—and a blister may be of benefit, although there is a sinus present.

Bruises.—The sensitive sole is liable to bruises, especially upon macadamized roads, where there are rolling stones. This causes more less lameness, and it is difficult to say just what part is affected; and there may be extravasation of blood in the sole, somewhat like a corn. A tap with the hammer causes pain; if more severe, it may be followed by inflammation, suppuration and extreme lameness. Then remove the shoe; cut down and give exit to the matter. The pincers also aid in finding the seat of lameness in the foot.

Seedy Toe.—So called because it is generally found in the toe, and the horn breaks or crumbles in small pieces, something like a millet seed. It is due to an impaired secretion, the result of some slight irritation or other, some predisposition, or to some direct cause, as large clip in shoeing, which presses upon the sensitive parts, causing an abnormal secretion. The hoof is easily broken down; you can even break down the connection between the wall and sole.

Treatment.—In many cases the horse is not lame, but it is an unsoundness, which may be overlooked. Remove the shoe, cut down the wall and diseased sole, and endeavor to remove the diseased parts. Apply a pledget of tow, saturated with carbolic acid, oil of tar, etc. Overcome the irritation by poultices, hot or cold baths, etc.; and it is good practice in some cases to blister around the coronet; or, if you

have plenty of time, use cold water. It is not very serious, but it requires some time for the healthy growth to take place.

False Quarter.—This term is usually applied to any condition where there is an abnormal condition of horn, and it is the result of an injury to the coronary substance. It secretes the horn, and if it is injured, it does not secrete properly. And in some cases there is no secretion from the coronary substance, but from the sensitive laminæ only; or, it may secrete, but there will be a ridge on either side. This does not do any great harm, but if the only secretion is from the laminæ, it is more serious. It may come in any part, most likely to come in the heel. Treatmenf is not often required. You may rasp it, if necessary. This may come from a calk.

NAVICULAR DISEASE.

Navicularthritis, Coffin Joint Lameness, etc.—This is common. The parts involved are the navicular bone and the bursa in connection with the perforans tendon.

Pathology.—There has been some difference of opinion among eminent veterinarians about the pathology of this. Contraction of the foot was supposed to be a disease, and we still hear of it, and it is quite plausible to a person not acquainted with the parts. But the so called specific for this disease will not stand the test when put into practice. Contraction is not a disease, but the result of disease, and especially of navicular disease. Some thirty-five years ago navicular disease was said to be inflammation set up in the navicular bone; then it was thought that it began in the tendon—Prof. Dick advocating that it began in the tendon. Prof. Williams says it commences in the cancellated structure or in the cartilage of navicular bone. Flemmings thinks it commences in the tendon. I believe it may commence in either of the three, and if it comes on slowly, it begins in the bone or bursæ; but if it is suddenly produced, it begins in the tendon; for we find that after a punctured wound in the foot, it is sometimes the case that the animal always remains lame from navicular disease. It is then in most cases the result of inflammation in the cancellated structure of the navicular bone, which extends and interferes with the nutrition of the articular cartilage, giving rise to caries. The bursa is destroyed and the tendon becomes attached to the bone. The tendonous fibers may become destroyed to some extent, which accounts for the tendon giving way after neurotomy. Contraction of the foot may be caused by a slight irritation of the sole, and sensitive laminæ, and it is difficult to say whether it is this or navicular disease, until after a time the symptoms become plain, if it is navicular disease.

Causes.—Hard and fast work are the exciting causes. In some animals there is a hereditary tendency—a short upright pastern, with a stubby, imperfect action, and a very high action, which pounds the ground; allowing the toes to grow too long, cutting down the heel at every shoeing, etc. We find it is rare in racing, hunting, and even in the trotting horses, so long as they are used upon the turf, although they are subject to hard and fast exertion, for they are shod so as to keep the

feet in a natural shape. But when they are shod with high heels and toes, and are driven upon hard roads, then they are liable to have navicular disease. Injury to the perforans tendon and irregular exercise tends to produce it.

Symptoms.—There is usually more or less lameness—very sudden and severe in some cases, in others slight and gradual—and perhaps for weeks or months it may be somewhat transient before it becomes permanent. Just when brought out in the morning he goes lame for a few steps, and then it disappears. He may be used in this manner for some time, and then grow very lame, then navicular disease is well established, the foot is pointed, etc. This may only be a habit, but when a horse has been used moderately, and is in good health, pointing is suspicious, and it may be present for some time before there is any well marked lameness or tenderness. If both feet are affected and he is suffering pain, then he throws the weight first upon one foot and then the other, and when brought from the stable he goes with a kind of groggy action, hence it has been termed grogginess. Another well marked symptom is atrophy of the muscles of the limb, which extends and involves the muscles of the shoulder. This is not sweeney, as it is called, but is the result of navicular disease. There are generally well marked changes—atrophy of the foot and contraction of the hoof—and is easily noticed if but one foot is affected. There are other means of forming an opinion: tap with a hammer over the region of the navicular bursa, and pain is evinced, or press upon the tendon at the back part of and close to the frog. This will assist you but it is not conclusive evidence of it, and you may, in exceptional cases, see a slight redness. Then there are negative symptoms. In a well marked case of navicular disease there is generally a nice clean limb. Look at the manner in which the shoe is worn. If it is navicular disease, it will be worn at the toe, but some horses do this in health more than others, so you must make allowance for it.

Treatment.—If it is of a severe character, and of long standing, perhaps years, then it is incurable. But if recent, in the inflammatory stage, of only weeks' standing, or perhaps months', then a complete cure may be effected. So you must take into consideration the length of time the disease has been in progress. Remove the shoe; cut down the toe; rasp the wall, and, in some cases, you may thin out the sole to a certain extent. Then allay the irritation by a judicious use of poultices, water-baths, either hot or cold. Keep him standing with the foot in water two or three hours a day. After the irritation ceases, then blister around the coronet, investing considerable surface, or, instead of a blister, you may use a frog seaton. Insert with a curved needle, after cutting down the frog and making an incision in the back part. Dress it with astringent dressings; keep it in for two or three weeks; shoe with high heels and short toes, if it is due to a sprain of the tendon, but in some cases the animal will go better with an ordinary low shoe. A leather sole may be useful, nicely stuffed with tow and tar, especially if the horse is used upon hard roads, but is not best in the mud. Sometimes it is advisable to use constitutional remedies—a laxative diet, if plethoric—if in the spring, a run at pasture, but if in the summer months, and the ground hard, there is not much benefit in it. Be careful about the shoeing, and do not allow the shoes to stay on too long. Although you are satisfied that the disease is incurable, from the symptoms, you may relieve it to a considerabte

extent. Neurotomy may be successfuly resorted to in some cases. This is division of the nervous cord and excision of a part of it, with a view to relieve the pain, but not with a view of curing the disease. The plantar nerves are the ones usually operated on. The low operation is the one likely to be successful, if performed in a proper foot—one that is contracted to a certain extent. Remove the shoe, bring the foot into proper condition, keep the animal quiet for a day or two, and bathe with cold water to allay any irritation and to remove the swelling; then cast the horse and make an incision about an inch long above the fetlock, exposing the nerve, and remove an inch or more of it, or reunion will take place—a sort of nervous tumor form and connection be established. It is not generally a difficult operation, but care must be taken not to injure the artery. If it is performed too high up, you may leave a branch that will furnish sensation. This branch runs obliquely from the inside down and outward. If you perform above this there will remain nervous influence. After operating, bring the edges of the wound together and apply cold water. When this operation was first performed for lameness it was performed upon all kinds of subjects, many of which were not fit for the operation—and this was one reason why it was brought into disrepute—but if you exercise judgment and select proper subjects, it will prove successful, do you credit and be beneficial to the animal; but if done indiscriminately, it will prove a lamentable failure. Endeavor to impress the character of the operation upon the owner, for I have known some trouble to arise from the neglect of this, where the operation was not successful. In a flat foot it is not likely to prove successful; but in a deep, strong foot, although small, it is attended with success. If reunion takes place, you may have to operate a second time. The dangers of neurotomy are from punctures, pricks, bruises, etc., which, on account of there being no sensation in the foot, run on to suppuration, and the first thing that will be noticed is a swelling and quittor, or the tendou may be ruptured from using it more freely than when pain was present. After an operation the animal should be watched carefully, the shoes applied with great care, and the feet should be examined every time the horse is brought into the stable.

THE TEETH.

Odontology is a treatise on the teeth. The teeth are hard and bone-like, and are the principal agents in mastication. They are a combination of inorganic salts, with the previously existing animal matter, and contain about seventy-six per cent. of earthy material, phosphate of lime, phosphate of magnesia, etc., the same as in bone. The teeth are the means afforded us to tell the age of the animal. We find they vary much in different animals, in size, structure, number and position, and also in motion, as for grinding, tearing, pounding, etc. In the horse there is a large grinding surface; in the carnivora they are sharp and pointed; in the omnivora they are both sharp and tabled. They are intimately related with the structures and habits of the animal, their form depending upon the nature of food upon which the animal lives. Teeth are of two kinds, simple

and complex. Simple in the human being and the dog, being covered with one coat of enamel. They are complex in the horse and ox, there being several processes of enamel brought into wear at the same time. This is why the lower animals are not troubled with the toothache. The tusk of a horse is a simple tooth, having but one coat of enamel; the others are complex, because they have external and internal enamel, bringing different tissues into wear at the same time. In describing a tooth we say it has a body or crown, which is above the gums; a table, or the grinding surface; the neck, or that surrounded by the gums; and a root or fang, which is inserted in the alveoli. Running up the center of the fang is a cavity which contains the pulp, a highly nervous substance. The sulcus, in which the teeth are inserted, are called alveolar processes, and exist only with the tooth, for if a tooth is taken out the cavity disappears. There are three substances in the tooth—dentine or ivory, enamel, cementum or crusta petrosa. These vary in proportion in the different teeth. Dentine is a yellowish white substance which appears homogeneous to the eye, but under the microscope it is found to be made of tubuli. These begin at the pulp cavity and radiate towards the surface, they are imbedded in a matrix and form a greater part of the body and fang of the tooth. The enamel is the hardest structure in the body, and forms a protective covering for the teeth. It contains about ninety-three to ninety-five per cent. of earthy material; it is a bluish white substance, covers the crown of the tooth, and in complex teeth it also forms an internal ring which brings the different parts into wear at the same time. It is small in quantity, and is made up of hexagonal prisms, it also covers the little depression of the tooth. There are three classes of teeth, the incisors or cutting, are situated in front, six above and six below; the canine, or tusks, are in the interdental space; the molars or grinders are twenty-four in number. The horse has two sets of teeth, the deciduous or milk teeth, which are temporary, and the permanent. The temporary are twenty-four in number, the permanent forty. The incisors show a center which is greater in the young horse, it is called the infundibulum, by means of which we are able to determine his age pretty correctly up to a certain age. This funnel shaped cavity is usually covered with tartar. Sometimes the teeth are dressed, but it is easy to tell the difference, the black mark has no ring of enamel. There is a little difference in the incisors of the upper and lower jaw, the upper have two grooves, the lower only one. The same is true of the molar teeth, those of the upper jaw being more widely separated, and nearly square in shape. The molars generally have two infundibulæ. The cutting of teeth in the foal varies some, with which the period of gestation has something to do. If the foal is born sooner than natural they may not appear so soon, but there are generally twelve molars and four incisors at birth, or if not at birth they will appear in about fourteen days. The twelve molars appear as temporary, the others as permanent teeth. The teeth are divided thus: The two occupying the center are called central, the two next—one on either side of these two—are called the lateral, the last two on either side are called the corner. So at birth the foal usually has two central incisors; in about seven to nine weeks the two lateral are cut; in from seven to nine months the third pair of incisors, and at one year the corner teeth are in wear; at twelve months the first permanent molar is up and in wear, so we have them thus:

	Incisors.		Molars.	
Age.	*Temporary.*	*Permanent.*	*Temporary.*	*Permanent.*
At or soon after birth	4	0	12	0
1 year	12	0	12	4
2 years	12	0	12	8
3 "	8	4	4	16
4 "	4	8	0	24
5 "	0	12	0	24

In ponies you may mistake temporary for permanent teeth. At about two years and nine months the central incisors appear; at three, they are up and in wear; at three and a half the lateral teeth appear; at four they are up and in wear. At four years old the horse has a full mouth of permanent molars. It is a good plan for you to recollect the time when the teeth make their appearance, and become familiar with the difference between the milk and permanent teeth. The milk teeth are whiter, and present a pretty distinct neck.

The teeth are alongside of each other, forming an oblong or parabolic arch, and are designated the superior and inferior dental archers, interrupted by the interdental spaces in the horse, but in some animals the teeth are continuous. There are three classes of teeth: incisors, canine and molars; then there are two sets of teeth: temporary and permanent. All the incisors and twelve molars appear as temporary teeth. The body of the tooth has an encircling ring of enamel, then dentine and then a central ring of enamel. In this center there is a black mark. The infundibulum disappears as the animal grows older. It is usually filled with tartar or food, and is surrounded by enamel. The teeth grows to a great extent from the pulp. But after this is destroyed, they receive support from the surrounding structures. In the molar teeth there are two or three of these pulp cavities. At an early period of gestation the teeth appear as a small depression in the mucous membrane of the gums, called the primitive dental groove. Then, in from twelve to fifteen weeks, (in the human being), a little prominence takes place, and this is called the papillary stage; then these papillæ become separated from each other and form along by the side of each other, and prolongations pass across between the different papilla, and they develop a follicle or bag; this is called the follicular stage. Then this follicle or bag becomes separated into a sheet-sac; this is called the sacular stage. Then a cavity appears between the teeth, called the cavity of reserve. The permanent teeth soon become developed; press upon and cause absoption of the temporary, until in some cases nothing but the crown is left, which drops out. There is some difference in the number of teeth in the domestic animals.

	Incisors.	*Canine.*	*Molars.*	*Bicuspid.*	
Man	$\frac{4}{4}$	$\frac{2}{2}$	$\frac{6}{6}$	$\frac{4}{4}$	=32
Horse	$\frac{6}{6}$	$\frac{2}{2}$	$\frac{12}{12}$	$\frac{0}{0}$	=40
Ox	$\frac{0}{8}$	$\frac{0}{0}$	$\frac{12}{12}$	$\frac{0}{0}$	=32
Dog	$\frac{6}{6}$	$\frac{2}{2}$	$\frac{12}{14}$	$\frac{0}{0}$	=42
Pig	$\frac{6}{6}$	$\frac{2}{2}$	$\frac{14}{14}$	$\frac{0}{0}$	=44

The central incisors appear at birth, or in two or three weeks; the lateral in about nine weeks; the comer in about nine months, and

they are up and in wear at one year old. The first, second and third molars appear as temporary teeth at or soon after birth. The first temporary molar is replaced by a permanent one when the horse is from two to three years old. The second and fourth appear, perhaps, about the same time when he is about four years old. The two permanent central incisors appear from two and a half to three years—at three they are up and in wear. The lateral from three and a half to four, and are up and in wear at four. The corner from four and a half to five, and up and in wear at five. But they do not come just the same in all animals. I have seen a full mouth of permanent incisors at four years old. Sometimes the posterior table surface does not wear down with the anterior—due to the way in which the teeth grow. This is called shell-mouth, and you might mistake an eight-year-old for a six-year old. Young teeth are widest from side to side; in old ones they are widest from before back. You can tell the age pretty well up to six or seven years. It is well to look at the upper jaw. Sometimes the upper jaw overlaps the under, giving rise to what is called a parrot mouth. At six years the posterior table surface of the corner incisors is up and in wear, and the mark is beginning to wear out of the central teeth, and when you see the mark worn out of the central incisors, you may say he is six years old. At seven the mark is worn out of the lateral, and at eight out of the corner incisors. By the upper teeth, which do not wear so fast as the others, we can determine the age pretty correctly up to twelve years. At nine the mark is worn out of the lateral, and at about eleven or twelve out of the corner incisors. And even after this, by watching the manner in which they grow, you can tell something of the age. You are also assisted by the tushes, which at first are small, but grow as the animal grows, or in some cases they wear down, and an accumulation of cement surrounds them, which tells you the animal is pretty old. Running horses, that are entered as such, date their birth from the first of January—although born in September, he would be called one year old on the first of January. Until lately, in some of the Southern of the United States, it was counted from May. Foals are generally dropped in the spring. Sometimes you have to give an opinion as to the age of the ox, which has no incisors in the lower jaw, but the place is occupied by a cartilaginous pad, and there are eight incisors in the lower jaw, which are called shovel-shaped, and are not so firmly set in the alveoli as in the horse. It is a natural condition, as a general thing, and not the result of disease. The same three tissues enter into their formation. The two incisors in the center are called the central; the next two, one on either side of these, the internal lateral; and the next two, the external lateral; and the last two, the corner teeth. There are twenty-four molars, of which twelve appear as temporary and twelve as permanent teeth. They are not so regular in their appearance as in the horse, varying according to gestation. The central and internal lateral, if not up at birth, will be up in a month, but they vary much from the breed and the care of the animal. You can form a more reliable opinion of the age of cattle by the teeth than by the horns. A well-bred short-horn will occasionally have a full mouth at three years old. The central permanent incisors appear at two years, the internal lateral at two and a half, the external lateral at three, the corner at three and a half. The first three molars appear as temporary teeth at birth, or in a month after; the permanent molar in six or eight months—up and in wear at one year; the second

permanent, the fifth tooth in the jaw, at fifteen or sixteen months—up and in wear at two years. At two or two and a half years the first and second temporary molars are replaced by permanent ones. A little later the other molars appear, and the animal has a full mouth at three and a half years. A sheep has the same number of teeth as the ox, and they are replaced much the same way, but generally a little earlier.

Unnatural Conditions, Irritation, Etc., of the Teeth.—Dentition begins at or soon after birth, and continues until the horse is five years old, and the animal suffers more or less during that time. The lower animals do not appear to suffer so much in getting their first teeth, but do suffer when getting their permanent ones, even more, perhaps, than the human being. Hence, we have dentition fever in the horse from three or four up to five years old—there is a weak pulse, impaired appetite, a staring coat, the bowels sometimes costive, and sometimes there is diarrhea; he is not able to work, and it is hard to say what is the matter, unless the system is affected by the irritation set up by the teeth, for all the organs appear to be in a healthy state. Such symptoms indicate that the temporary teeth are not being displaced in a proper way. The same applies to cattle. The food passes improperly digested, which may be entirely due to the state of the teeth. It is well in such cases to examine the mouth, and if you find some tooth not properly displaced, the gums swollen, remove it—which you can sometimes do with the thumb and finger, or you may have to use the forceps. Then give a mild laxative, feed on soft food and the animal will soon recover.

Lampas is very common. It is not certain whether it should be called a disease or not, but it is called a disease, and no doubt there is a change going on in the surrounding parts as well as in the teeth, sometimes involving the submucous tissues, and from the swollen condition of the gums it may interfere with mastication. The gum may be even with or even extend over the teeth. Scarify such cases with the lancet, making two or three incisions, but do not make any incisions behind the third bar, or you will injure the palatine artery and cause profuse hemorrhage, but cut to either side or before the third bar, then feed upon soft food. Sometimes astringents are useful, alum and water being very good, two or three drachms of alum to a pint of water. The brutal practice of using a hot iron was and is still sometimes used, and I wish you to set yourselves entirely against such treatment; it is entirely uncalled for. There is no great harm in scarifying, and it is sometimes highly necessary, but you will have to do it when there is no use in it; if you do not the animal will be taken to some one who will perhaps burn him, and you might as well get your fifty cents or a dollar, and save the animal. Give a few doses of tonics, and the animal will come out all right. You may be called to check severe hemorrhage from the cutting of the palatine artery, which is best done by pressure. Saturate some tow with a styptic and place against the parts, or you may take a block of wood and tie it in the mouth to keep the tow in place. You may meet a case where it is necessary to use the actual cautery. There is no great danger of fatal hemorrhage from this accident, but it might weaken the animal to a great extent.

DISEASES OF THE MOUTH.

The gums are sometimes irritated in connection with the molar teeth, this irritation extends and affects the pharynx and larynx, and perhaps a severe cough is the result, called a dentition cough. It is often the result of but a slight irritation at the back part of the gums —this cough may not be very severe, but it is troublesome—or the gum may become tumefied. The best treatment is to scarify it. We find tumors in the upper and lower jaw, perhaps from the imperfect development of the teeth, or from their growing in an improper manner, from slight injury, irritation, etc. They may or may not be malignant, and are likely to extend and involve the alveoli and bone. If not malignant, and only upon the surface, it is called epulis, and is not very common. If not malignant remove it, and you may also have to extract some of the teeth, then treat as a common wound. If malignant or cancerous, although you are able to remove it, and it may do well for some time, it will return, extend and become a hopeless case. The horse sometimes suffers from sharp, projecting teeth, which occurs more commonly in old horses, from the wearing down of the teeth in an uneven manner. They will be sharp on the inner edge of the lower jaw and the outer edge of the upper jaw, which may be from faulty formation. In such cases the animal has difficulty in eating, grinds his food, ejecting it. Perhaps when driving him he carries the head to one side, from the bearing of the bit not being the same on both sides. If the teeth are sharp in the lower jaw they lacerate the tongue; if in the upper they lacerate the cheeks. The best remedy for this is the tooth rasp, and there is no necessity for using the balling iron or twitch. After rasping, feed upon soft food for a day or two. There are more difficult cases where the teeth project to some extent, generally in old horses, due to malformation of the jaw. Sometimes the upper jaw extends over the lower, and a part of the last tooth is not worn down properly, and after a time it interferes with mastication, and the animal suffers considerably from irritation. The same appears in the anterior tooth of the upper jaw, but it is not so serious as the back tooth. The animal may be reduced to a walking skeleton, almost; although the appetite appears good, the food is thrown out. You can detect by examining with the hand, and if it is the last molar tooth you must throw the horse, use the balling iron, and remove by means of the tooth shears or the large forceps. If it is in front there is no necessity for throwing the animal. After using the shears rub the parts down smooth with a tooth rasp, and feed properly, and he will improve rapidly. When these growths are from malformation they should be watched closely, and no doubt sooner or later they destroy the condition of the mouth, and it becomes necessary to destroy the animal, but it can be relieved to some extent by the rasp, chisel, shears, etc. There is, as well as the shears, a sliding chisel, and when you use it, it is better to use a wooden mallet than a hammer. In using the straight chisel there is another instrument for an assistant to hold against the back part of the tooth while you chisel it off.

Caries of the Teeth.—The lower animals do not suffer from this as much as man, for two reasons: their teeth are complicated, and the mode of living. Sweets have a bad effect upon the teeth. Horses rarely suffer from toothache, but they frequently suffer from carious teeth. Caries may commence either on the table surface, root

or fang, or even in that which surrounds the tooth; or it may result from a slight injury, as getting a stone, etc., between the teeth when masticating; or it may begin in the fang from improper development of the dentine, which receives its nourishment from the tooth-pulp, and when this is gone the tooth does not receive proper nourishment, etc.

Symptoms.—In the early stage they are not very plain, but become better developed after a time. The animal will show some irritation while eating. Although he is hungry, and goes ravenously to eating, he will all at once quit masticating, and either holds the food in the mouth or throws it out unchewed. This may be due to a slight irritation of the teeth. He acts something similar to the human being, and these symptoms may be present for some time before the well-marked symptoms appear. But in, it may be, six months or a year, certain distinct symptoms appear. If it is in the table surface, the tooth is brittle, and wears down more readily, and the tooth opposite to it grows longer; he quids or rejects the food, and a peculiar stench or fetor is present. The animal falls off in condition, in most cases. When it is in connection with the root or fang it is different. As it extends it involves the other tissues, sets up irritation in the superior maxillary sinus, if it is in the upper jaw, and gives rise to a somewhat putrid and offensive discharge. If it is in the lower jaw, as well as the symptoms given, you will, perhaps, notice a slight enlargement which extends down the lower portion of the jaw; sinuses form and matter is discharged. Exercise care and judgment and you need make no great mistakes. I knew a horse destroyed for glanders when it was only a carious tooth.

Treatment.—Remove the tooth—and this is not very easily done, but there are various ways. Open the mouth by means of a balling iron, and, if practicable, use the forceps. The trouble with the forceps is, they are apt to break the tooth when they are closed upon it too tight. There is a tooth key which can be used in the lower jaw, as the teeth in that are easier removed than those in the upper jaw; or you may remove by trephining, and then by inserting a punch it can be driven out. When you attempt to remove a tooth, and it breaks down, it will, in many cases, come away of itself without further treatment. The first and second molars are more difficult to punch out than the others. After treatment: keep the animal quiet; feed upon soft food that does not require much mastication. There is a difference in treating the cavity. Some recommend filling it with gutta percha, to prevent the food from passing into the sinus. It will sometimes pass into both sinuses; but generally there is no necessity for filing it. If you trephine, it is more needful than in pulling. If food does pass into the sinuses, then it will be necessary to fill the hole. Sometimes in parrot-mouth the incisors of the lower jaw grow and irritate the mucous membrane of the opposite jaw, when it is necessary to rasp them down.

Wolf Teeth are supernumerary, just in front of the molar, and you are often asked to remove them, and sometimes they do harm, but that is the exception, and not the rule. They are easily removed with a pair of small forceps, or they may be punched out. Some think they interfere with the eye, by exerting some influence upon the ophthalmic division of the fifth nerve, but I do not think they have anything to do with irritating the eyes. Tooth substance may be de-

veloped in almost any part of the body; in the muscles by the ear; in the frontal sinuses; and even in the remote parts of the body; even in the testicle, of which I have a specimen. It is common in the lower animals, but not in the testicles.

A Foreign Body sometimes gets lodged in the mouth, as a piece of wood from his hay, etc., and possibly becomes imbedded between the molar teeth, and the animal is not able to get it out. There will be difficulty in masticating; a flow of saliva; the animal stands with the head poked out, as if suffering from sore throat. He will partially masticate, then try to swallow, and perhaps eject the food. These symptoms are present in sore throat, and it is necessary to make a careful examination; you are not likely to mistake just one case, but if there is some other disease prevalent that presents similar symptoms, then you are liable to make a mistake.

The Tongue is sometimes injured, sometimes by catching the tongue under a twitch, from tying a horse to a wagon, and something causes him to pull back suddenly, and the tongue is lacerated. Bring the parts together as quickly as possible; sew them up, and feed upon soft food. And another way of injury is in giving medicine, by holding to the tongue when the animal pulls back—the muscles become paralyzed, the tongue hangs out of the mouth, and it is lacerated by the teeth. If you think there is a chance of reunion, get the parts into the mouth and keep there by means of a nose band; but if it is cold and almost dead, then it is necessary to remove the part, which is easily done. It is not, in most cases, necessary to throw the animal, and there is no great amount of hemorrhage, as it was lacerated, and such a wound does not bleed very freely. Feed upon sloppy food; give no hay nor anything that would hurt the parts. There will be a peculiarity in the animal's drinking, as he will place his nose deep in the water after losing part of his tongue. If the irritation came from the use of the twitch it is easily overcome, although it looks very formidable at first. It is best overcome by scarifying slightly in two or three places and bathing in lukewarm water. Place the tongue in the mouth and keep the mouth shut by using a nose band, and it will soon regain its natural condition.

The Frænum Linguæ, or the fold of mucous membrane beneath the tongue, is often injured in drenching or giving a ball, or from a foreign body getting in the mouth. It gives rise to a discharge of saliva, difficulty in masticating, the food gets in and increases the irritation, and he falls off in condition.

Treatment.—Clean the parts, wash in tepid water, inject a weak solution of carbolic acid, sulphate of zinc, or alum water, etc.

INJURIES TO THE MOUTH.

Laceration of the Lips.—Bring the divided edges together and secure them; keep the animal quiet. There are also small tumors, which may be produced by some injury or irritant. If they contain matter, make an incision and let it out—and it is generally better to

make the incision in the mucous membrane instead of the skin—then bathe with astringents. There is also a small egg-shaped tumor that appears in connection with the false nostril, which contains a cheesy-like substance, and it is possible for it to become encysted and remain there for a long time. Open and squeeze out the matter, and, if necessary, inject with carbolic acid. The lips may be injured from sharp teeth, or it may be the result of injury from the bit, producing irritation and, perhaps, inflammation, and if matter forms, let it out, either internally or externally, as required, at the same time removing the cause. Or there may be cysts in the ducts at either side of the fraemum linguæ, which are called ranula—not very common in the horse. Best treated by opening them up or cutting them out, which can be done with the scissors; then use mild astringents, or you may even touch with mild caustics. The tongue may become paralyzed from disease of the brain and paralysis of the lips, which usually occurs from injury or exposure to cold, for which see lecture on Nervous System.

Glostitis, or inflammation of the tongue, is not very common, but may result from injury, from pulling the tongue violently while giving medicine, or from eating poisonous herbs, which irritates, and inflammation results; or it may be due to the administration of irritant medicines, as ammonia, or even sweet spirits of nitre, if not sufficiently diluted. It may extend and involve both the extrinsic and intrinsic muscles of the tongue. If it occurs it is in the mucous membrane.

Symptoms.—There is a flow of saliva, impaired mastication, a difficulty in swallowing and in respiration, until it is sometimes necessary to resort to tricheotomy. This is easily seen; the tongue is reddened, painful upon pressure; perhaps there is fever and the tongue protruding from the mouth. It may terminate in resolution or suppuration; small abscesses form in different parts, and sometimes induration, and then the tongue loses its condition to a great extent; there appears a kind of transverse crack; the animal cannot masticate, becomes greatly emaciated, and death may occur from starvation. It is often caused by some foreign body in the tongue. I knew a needle to produce this in a severe form.

Treatment.—Remove the cause, give a laxative—oil or aloes if in the horse, epsom salts is better in cattle. Gargle the mouth with tepid water or laudanum, or if it is from the administration of ammonia use vinegar and water, and if it is greatly swollen scarify it in one or two places and then bathe and allow the matter to escape when it forms. You can sometimes prevent induration by scarifying and applying something, as salt and water, which irritates it to a certain extent, and may prevent it. Iodine applied to the lower jaw and given internally may be of use. When induration is once established the animal is useless.

Barbs is a term applied to an enlarged condition of the papillæ or orifices of the sublingual or submaxillary glands. It does not require much treatment, but these enlargements are sometimes barbarously removed. They may be removed or subdued by astringents or cold water.

Apthæ or Thrush.—This is properly a disease of the digestive system, or sometimes called a dietetic disease. It is called a sporadic apthæ, to distinguish it from epizootic apthæ, which is rarely seen in

this country. The sporadic affects the mouth and the whole alimentary canal. Vesicles and pustules appear on the tongue and lips, and may extend to the skin of the lips, and I believe it extends throughout the whole alimentary canal. It is due to indigestion and poor food of any description, bad hay being particularly apt to cause it, and the feed affecting many at the same time has given rise to the supposition that it is sometimes contagious. There is a dietetic disease called stomatitis contagiose, which is also from faulty digestion.

Symptoms.—The appetite impaired, the mouth hot, the pulse quickened some but not much, and the temperature slightly increased, perhaps one or two degrees. He is unable to masticate, and then these small vesicles appear, which run into pustules in some cases.

Treatment.—Remove the cause; give a slight laxative—two, three, or four drachms of aloes—but do not give a large dose, for the alimentary canal is already irritated. You may give it in connection with gentian or ginger, or a small dose of oil. Give vegetable and mineral tonics, or ginger and carbonate of soda, one drachm each, once or twice a day. Use a gargle of alum and water, or a little carbolic acid may be added. Sulphate of copper, nitrate of silver, etc., may be used as stimulants, or you may give quinine in one-half drachm to one drachm doses. Dissolve it in sulphuric acid, and the best way to give it is in a drench in water.

Inflammation of the Palate and Pharynx sometimes results from balling with a stick, or it may proceed from some little foreign body lodged in the parts. Laryngitis is more common, and much more severe than pharyngitis, and is sometimes produced by the violent use of the probang.

Symptoms..—There is great fever; swelling both internally and externally, and perhaps the fever is followed by death in from twenty-four to sixty hours. There are all the ordinary symptoms of sore throat, and a stench comes from the throat, and in cattle the swelling extends towards the ear, especially if produced by the probang. Use fomentations, give a moderate dose of sedative medicines, and use judicious counter-irritation; try the inhalation of vapor, and if it gives relief, continue; if it seems to cause distress, do not use it. And use any of the ordinary gargles, and it may terminate in resolution. Abcesses also occur in the pharynx, and it is hard to say what causes them. It is more likely to attack cattle that have a tubercular tendency. In the horse it may result from sore throat, direct injury, etc. If it is high up it interferes with respiration, and there is usually a discharge from the nose; a difficulty in swallowing, etc. The symptoms in cattle are similar, but are not generally so violent; he may take some food, but there is a peculiar breathing. You may detect a bulging by pressing on either side of the throat. The treatment given is to open these abcesses, but it is not very successful. I have never seen it done with success in the horse, but it is more easily done in cattle. There is danger of the matter passing down and suffocating the animal. Use a guarded knife, or a concealed bistouri; a small knife well guarded, is very good. But you are working in the dark to a certain extent; however, opening may save life occassionally.

Pharyngeal Polypi.—These sometimes have a constricted base; others have a wide base; the animal will fall off in condition, shows fits of temporary choking, coughs violently, staggers, and perhaps falls,

and then is relieved, after which there is a discharge of blood from the nose; this shows you there is some irritation in connection with the pharynx. If it has a constricted base, you may remove it with an ecraseur, but if it has a broad base, it is better to let it alone, especially in an old horse. There is difficulty in the hemorrhage passing down the trachea and causing inflammation of the trachea and lungs.

Œsophagus.—Choking occurs in all animals, but is more common in cattle. It may be due to an improperly masticated bolus of food, and this is a severe kind of choking; or, it may be from a hard body, as a piece of a turnip, potato, apple, etc., from a ball being given in a hard form. Hence it is necessary to soften balls before giving them. It is sometimes produced by giving an egg without breaking it, or from something taken with the hay. Thorns have been found lodged in the œsophagus. It may either be in the cervical or thoracic portion, aud the symptoms are more distressing when in the cervical portion. There are signs of uneasiness; if there is an attempt to swallow liquids, they are regurgitated; there is an increased flow of saliva. In the horse there is a spasmodic retching of the neck, especially if it is in the thoracic portion; there is difficulty of breathing, which may increase and cause suffocation.

Symptoms.—Pass the hand along the course of the œsophagus, and if it is in the cervical portion, you can detect it. Another symptom in cattle is tympanites; but this does not always occur.

Treatment.—If the symptoms are not very prominent, endeavor to find the nature of the obstruction, and then the situation of it, and if it is in the pharynx or cervical region, you may be able to displace it by manipulation. If you fail in this, give a little liquid—some oil if it is a hard body; but be careful with oil, if it is some partially masticated food. If this also fails, use the probang; a leather one is best for cattle, and it is not necessary to cast the animal, but it is well in some cases to use the guide to prevent injury to the probang. The treatment in cattle is just the same; and when you fail to remove it with the probang, cut down if it is in the cervical region, and remove it; then bring the edges together by a suture. Keep the animal quiet, and give no food but a small amount of liquids for some time. This is not a very successful operation, but if all other means fail, try it. If there is much tympanites and symptoms of suffocation in cattle, use the trochar.

Dilatation of the Œsophagus sometimes results from choking. It may dilate to a great extent and cause alarming symptoms; the animal is from time to time attacked with symptoms of choking, which is better noticed when the food is changed. If it is in the cervical region there will be a pouch formed, which can be felt or seen. If it is in the cervical portion, it may be relieved in some cases by a pad supported by a bandage around the neck—by careful and frequent feeding; and do not give a sudden change of food. Some say to cut down and remove some of it, but this is impossible. There sometimes is just the opposite of this, or

Stricture of the Œsophagus.—There are two kinds, spasmodic, and a thickening of the mucous membrane, and when one part becomes dilated from choking another part is apt to be constric-

ted. There is difficulty in swallowing, and food may collect above the stricture, or may become regurgitated; flesh is rapidly lost, and the animal may linger for weeks or months and then die. Sometimes you are justified in passing the probang, and when it comes to the stricture it will be resisted, and you may overcome the stricture by the use of the probang. Every day, or every other day, a dose of aconite or such remedies may be useful. Sometimes rupture is the result of choking, and is very serious. It generally comes from the use of some such thing as a whip stock, to relieve choking, and it might be done with a probang. There is both external and internal swelling, great pain, pulse somewhat quick, offensive breath, in swallowing, the substances sometimes pass into the areolar tissue, etc. It generally proves fatal. Some recommend cutting down and treating as œsophagotomy, but death generally occurs in two or three days.

DISEASES OF THE GLANDS, ETC.

The Salivary Glands.—There are three pairs of salivary glands—the parotid, submaxilary, and sublingual. They secrete the saliva, which is mixed with the food and fits it for digestion.

Parotid Glands.—Inflammation of these is not uncommon in connection with strangles. It is a hard, inflammatory swelling, extending from the ear downward. In the horse it is apt to terminate in suppuration, and sometimes in induration. Slight induration is not very uncommon, especially in those horses that are tightly reined, producing irritation and thickening of the gland. Use fomentations, poultices, and stimulating liniments—ammoniacal or a weak solution of biniodide of mercury—and you may bring about resolution; but there is a great tendency to suppuration. When matter is formed open it up, and if the animal is weak give iodine. Inflammation of these glands is often found in cattle, in connection with tuberculosis, and the inflammatory action runs on to suppuration, but not so quickly as in horses. A small amount of matter may become imprisoned and remain there for a long time. It is necessary to use a stronger embrocation on cattle than horses. Let the matter out when formed. I have noticed in cattle that sometimes the surrounding parts are vascular, and it is generally advisable to open carefully on account of hemorrhage. It is sometimes best to explore it with an exploring needle and then enlarge the opening carefully. Induration sometimes takes place, and the best remedy in this and all glandular enlargements is iodine. Iodine one part, iodide of potassium one part, and lard four parts, and give iodide of potassium internally.

Steno's Duct.—The duct of this parotid gland winds around the inferior maxillary bone and enters the mouth between the second and third upper molar teeth. This gland secretes during mastication only; the others secrete whenever food is taken in the mouth.

Fistula of this Duct is not uncommon in horses. It sometimes results from injury and sometimes from an abscess in irregular strangles, or it may be due to the incautious opening of the abscess, or some obstruction passing into the duct from the inside of the mouth.

Symptoms.—There is a discharge of thin watery fluid, which is increased during mastication. When the horse is not masticating perhaps the only thing noticed is a small opening on the outside of the jaw, and a slight discharge, but if dry food is given there will be a greatly increased discharge. The losing of this saliva interferes with digestion, and colic may be the result.

Treatment.—In a recent case this is sometimes easily overcome, but if of long standing it is more difficult. Paint it with collodion and keep very quiet for several days; give no solid food, and only just enough fluid food to sustain life. If a case of longer standing, scarify the edges and then bring them together and secure by means of a pin; then use stimulants, or touch the parts with mild caustics. Some object to caustics, but I have seen them prove of benefit. If the means given fail, then endeavor to make a new duct by inserting a small seaton right into the cheek, and keep it there and stimulate with some stimulant until a new duct is formed.

Salivary Calculi.—Any gland that has a well-marked duct may have calcareous deposits, and we find them in the parotid duct—both in horses and cattle. They may obstruct the duct and set up fistula. The flow of saliva is obstructed to a certain extent, but if the duct is suddenly obstructed, then there is dilatation of the walls, which, perhaps, can be felt. The remedy is to cut down and remove the calculi; secure the wound with a pin; keep the animal quiet, and give no solid food for several days.

Ptyalism, or Slavering.—This may proceed from food, and is common in horses and cattle; it also results from the use of mercury. This shows itself by an immense flow of saliva. It may literally run from the mouth, and if it is continued it interferes with digestion. The best remedy is to change the food, and sometimes give a laxative, followed by tonics and stimulants, and use a gargle of alum water. If it is due to mercury, then use mercurial antidotes.

DISEASES OF THE STOMACH.

The Stomach of a horse is small in proportion to the size of the animal, and digestion takes place quickly, and the horse does not suffer so much from indigestion as ruminants or as man does. A horse can undergo pretty severe exertion after a hearty meal without showing any inconvenience. However, the stomach of the horse is liable to derangements, and, perhaps, the most serious is acute indigestion, which destroys a great number of horses, and I think I may safely say that at least three-fourths of the heavy Clyde horses that are imported to this country die from this disease, which is brought about by injudicious feeding or carelessness. It is very common in horses that are worked hard and fed well. It is an accumulation of food and gases in the stomach, and also in the intestines, and a fatal result is inflammation of the mucous membrane, called

Gastro-Enteritis.—A horse may be in good health, become affected and die in twenty-four hours or sooner.

Causes—Giving a large amount of food, especially if it is hard to digest; bran, for example, especially if there is shorts mixed with it and not submitted to the action of hot water for some time. It will produce acute indigestion almost as quickly as any kind of food. If a horse has a full stomach and is put to hard work, digestion does not take place properly, and disease is the result; or, giving a full feed when the stomach is weakened from hard work, and as a horse grows old or gets bulky food, the stomach becomes unnaturally dilated, and the walls become very thin, and the gastric juice is not properly secreted; and after fasting, a horse should not get much food until the secretion of the gastric juice is stimulatad by giving a small amount of food. Another common cause is a change of food. Wheat, even a small amount, will produce it. Clover hay, when the animal is not accustomed to it, is also a common cause. Acute indigestion may terminate in rupture of the stomach, especially in old horses or any that are fed upon poor food. It may not be complete, but just some of the coats are ruptured. Rupture of the diaphragm is not uncommon from pressure, and the animal throwing himself about.

Symptoms.—We will take a case as we often see it on a farm: The farmer intends to take a journey of fifteen or twenty miles, and the night before he feeds the horse more than usual, gives another large feed in the morning, and starts off. The horse is quite lively, but after going a few miles he becomes dull, sweats, and sweats freely; is stopped, and shows signs of abdominal pain; attempts to lie down, turns the head to the side, and if examined, perhaps slightly swollen in the flank; gets some better, and is driven again; again shows symptoms, and perhaps has a slight diarrhœa; becomes sluggish, but finally reaches his destination, is put in the stable, and soon shows violent symptoms; lies down and tries to balance himself upon the back, then gets up, turns around, lies down, looks at the flank, the eyes staring, and in many cases the bowels are tympanitic. But I think the stomach may be dilated, even ruptured, without distention of the bowels; the pulse fifty or sixty beats per minute, and eructations of gas, which is a good sign; and regurgitation of food, which passes through the nose of the horse and the mouth of the ox, the eructationg are extremely sour, the symptoms become more and more severe; by and by he seems relieved to some extent; the mouth is clammy; the pulse almost imperceptible, perhaps a slight diarrhea; the rectum bulged out, and death ends the scene; and this may all take place in from twelve to sixteen hours. Boiled food is also liable to produce this. In other cases the symptoms are not so plain; perhaps the horse paws; the pulse forty or forty-five; gases are generated; he appears uneasy, etc., which may develop into the symptoms just given. Some say that regurgitation is symptomatic of rupture, but I think that rupture generally takes place after regurgitation.

Treatment must be energetic and persevering, but when gastro enteritis sets in death is the result. There may be rupture of the bowels, as well as rupture of the stomach. There are various remedies recommended, but I give turpentine two ounces, laudanum two ounces, and linseed oil one pint. You may use nitrous or sulphuric ether instead of the turpentine, and give injections of soap and water, and even add a little turpentine. If there is great pain use hypodermic injections, two, three, four or five grains of the acetate of mor-

phia, and repeat, giving one-half the dose in a half hour or an hour if the pain remains, or you may use the muriate of morphia. As well as this give six or eight drachms of aloes, and I think it is good practice to give two or three drachms of the carbonate of soda or ammonia in cold water gruel, or in the form of a ball. Use judicious counter-irritation to the bowels, rubbing them well, and use blankets wrung out of hot water placed over the abdomen, and cover up as well as you can, and when relief is obtained to a certain extent, then do not push medicines too far. Instead of using laudanum you may use belladonna, and it is perhaps preferable in some cases. The horse should be kept so as to prevent him from throwing himself about, for there is danger of rupture. There is benefit in puncturing in all cases where the bowels are distended to a great extent. Puncture in the right or left side, but generally in the right side, and in the most distended part between the illium and the last rib, and pass the trochar slightly downward. It is best to first make an incision, as the canula will come out easier, and is not so liable to irritate the parts. Do not be too rash in using the trochar, for if gastro enteritis is present death will result, and the owner would lay the death to the use of the trochar. If you fail to strike the colon you can puncture again, and if a liquid passes instead of a gas it is unfavorable, but I had such a case to recover. I recommend each one of you to get a trochar, and if properly used it will do you credit. There is not much danger in puncturing. There may be an abscess, but it is not very serious, and even peritonitis may supervene, but that is the exception and not the rule. A horse should be carefully used for some time. Acute indigestion may terminate in laminitis.

DISEASES OF THE INTESTINES.

Rupture of the Stomach is a sequel of acute indigestion. If an animal has suffered from acute indigestion pretty violently for several hours, and becomes quieter, the pulse weaker and weaker, the mucous membranes become pale and blanch, which were reddened a short time previous, and the animal attempts to sit upon the haunches and wistfully looks at the flanks, the ears cold, etc., the chances are that it is rupture. These are also symptomatic of intus-susception, volvulus calculus, etc. Regurgitation is another sign, but I think that it takes place before rupture, for if there is a considerable rupture the food passes into the abdominal cavity, and I do not think that vomitism can then occur. There is generally spasmodic breathing and death in perhaps three or four hours; but I think I have known an animal to live ten or twelve hours after rupture occurred. Nothing can be done for it.

Chronic Indigestion, or Dyspepsia.—This is common, and may result from a disorder of the stomach or intestines, derangement of the liver and irritation of or shedding of the teeth, but generally from the stomach, caused by injudicious feeding on over-stimulating food. Clover is apt to produce it by causing an over-acidity of the stomach.

Symptoms are not very alarming or violent. The horse falls off in condition, perspires more freely when at work, the coat appears dry,

dusty and staring, the pulse slow and weak, the feces are of a lead or clay color, or, in some cases, somewhat dark, varying with the food to some extent. The animal is, perhaps, subject to slight attacks of colic, and has a depraved appetite—he will, perhaps, lick the lime from the walls. This is, perhaps, a craving of nature to overcome the acidity of the stomach.

Treatment.—Order a change of food. No matter how he has been fed, order a change, and in most cases give a moderate dose of physic—from five to eight drachms of aloes, and feed carefully for a few days, and in some cases you may combine calomel with the aloes, if there is any derangement of the liver. But I am no great advocate of the use of calomel; also, use anti-acids, carbonate of soda and ginger in a ball, or drench with water, or in the food, if the animal will eat it. If there is weakness, give beer with one and a half drachms of gentian or ginger, and after a week or two give tonics. But I think harm is sometimes done by giving tonics before the system is prepared for them. Give sulphate of iron, and even a little arsenic with it, or give sulphate of quinine. Perhaps the great secret in treating this disease is a change of diet.

Spasmodic Colic is a spasmodic contraction of the muscular fibers of the intestines. The contraction of this muscular coat tends to pass the contents toward the anus. Although spasmodic colic may be said to be contraction of the muscular coat of the small intestines, I think it may also affect the large intestines. In an ordinary case there is no great amount of the intestine contracted, perhaps a few inches to a foot or more, and if it continues, intus-susception may take place, or the mucous linings may adhere together, from being pressed together so close by the contractions of the muscular fibers.

Causes.—Perhaps the principal cause is a change of food. Giving cold water when the animal is heated may cause it, but not very often. Roots, especially if frozen, and sometimes if in a proper condition, may cause it. Some horses are particularly susceptible to colic. Sudden changes of temperature tends to produce it, and also constipation of the bowels, which sometimes supervenes a cathartic; and when giving a purgative, it is best to continue it with gentian, ginger, etc. Although spasmodic colic is very painful, it is not very fatal, and is usually of short duration. It generally terminates favorably, and it may terminate in enteritis, although some think it never does.

Symptoms.—The attack is very sudden; the animal begins to paw and cringe; looks at the sides, throws himself violently upon the ground, after perhaps cringing down some. He lies down rather easily in enteritis. In colic he attempts to lie upon the back—will perhaps roll back upon the side, get up, and he may be quiet for a while, and may even take a little food, and then again be seized and show similar symptoms. In some cases he may be covered with profuse perspiration, and may pass feces in small quantities, and there are frequent endeavors to urinate, which tends to mislead some who do not understand the disease. It is generally a good symptom to see him urinate. You will also be guided by the condition of the circulation. Take the pulse early in colic, during the violent symptoms, and it perhaps will be sixty, and if taken a few minutes after, when the horse is standing still, it may be only forty or forty-five in a minute. In enteritis the pulse begins about forty or forty-five and gradually increases, is full and bounding and continues; but the

pulse varies in different attacks of colic. If it attacks a horse after a hard drive, or one in a debilitated condition, the pulse will be weak, and perhaps fast, but still differs from the full bounding pulse of enteritis. In colic, pressing upon the abdomen appears to afford relief, and causes pain in enteritis. In a case of colic likely to terminate fatally, the symptoms become more violent, and death may occur from extreme muscular contraction, or from terminating in enteritis, and it may so terminate. It is of short duration in some cases—the animal is as well as ever apparently—in other cases it may last ten or twelve hours or more; but such cases are not very violent, generally, for the horse could not last so long under such severe pain. It is usually easily diagnosed, but you may meet a case that will give you some trouble to tell whether it is colic or enteritis.

Treatment is generally satisfactory, and a student, when asked what he would do if sent for in such a case, said he would "go just as fast as he could, or the horse might be well before he got there;" and it does not matter so much what remedy is given, if it is given in time. Bleeding was at one time regarded as the sheet anchor in treating colic; and sometimes it is good and acts like an anti-spasmodic, but I do not recommend it. Every practitioner has his favorite remedy, and I give sweet spirits of nitre, one to two ounces; extract of belladonna, one to two drachms, in solution, with two ounces of water. Or, sweet spirits of nitre, one to two ounces; and laudanum, one to two ounces, in six to eight ounces of water, and give injections, and a little turpentine may be added to the injections. Some recommend always treating with a large dose of purgative medicine, but I can not agree with them; but, in any case where the bowels are overloaded, give six to eight drachms of aloes, after giving anti-spasmodics. And there is another way of treating this: that is by hypodermic injections of the acetate of morphia—but you must be careful not to inject it into a blood vessel—and if it does not act just as you desire, do not be too hasty in giving another, or it may act more powerfully than you desire. Chloral hydrate is recommended. I have tried it, but have been more successful with what I have recommended. Turpentine, laudanum and oil was Prof. Dick's favorite remedy. If you give a dose and there is no relief, repeat the dose in a half hour, and if you think there are symptoms of enteritis, withhold the stimulants. I have used opium, but I now prefer hypodermic injections. If you have no remedy at hand, then give ale, beer, whisky, etc., and common salt may, perhaps, expel the attack. Put the horse in a comfortable place, and let him roll about as much as he pleases, and a little exercise may be of use, but any great amount will do harm. I think it is better to keep him in a comfortable box or yard. Rub the belly well, use judicious counter-irritation, hot water, mustard, etc. If a horse suffers repeated attacks, the bowels become weakened, and, sooner or later, it will terminate fatally.

Flatulent Colic.—It is hard in some cases to tell the difference between this and acute indigestion, but the bowels may be flatulent and the stomach not be affected. It consists of gases; there are carbonic acid gas, sulphuretted hydrogen, and in some cases carburetted hydrogen. Flatulent colic is more common in old than in young horses—perhaps because digestion is impaired to some extent—and in horses that have been fed for a long time on over-stimulating food.

Causes.—A change of food or feeding soon after a long drive. Indian corn, or inferior food of any kind is likely to produce it.

Symptoms are similar to spasmodic colic; the animal lies down and rolls, etc., and the abdomen soon becomes distended, and in a pure case there is no regurgitation of food nor eructations of gases, but just distention of the bowels, and one part of the colon may be affected more than the others.

Treatment.—Give injections freely, and you may be able to overcome a slight attack by injection, but medicines may be necessary. You may put one or one-and-a-half ounces of turpentine in the injections; this may relieve it, although the intestines are pretty full of food, but may have to remove the contents of the rectum with the hand. Chemically speaking, the best remedies would be lime, ammonia, etc., which would combine with the gases and form new compounds, and so afford relief; but they do not act so well internally in all cases; but give turpentine, one to two ounces, with linseed oil and laudanum or belladonna, according to the suffering; or, you may relieve the pain by giving two or three grains of the acetate of morphia, hypodermically; and it is good practice in some cases to give a purgative and carbonate of ammonia, one, two or three drachms, in the form of a ball, or rubbed down in a little cold water or gruel with some mucilage, and give as a drench. You must be careful in giving aqua ammonia, or it will cause great irritation. The horse requires great care, and you will find carminatives, stomachics, etc., useful; and see that he gets good, nutritious food, and if internal remedies have but little or no effect, then puncture; and I believe puncturing is more successful in a pure case of flatulent colic than in any other disease. Flatulent colic may terminate in enteritis, but is more likely to terminate in rupture, or it may terminate in death by asphyxia. It is good in some cases to prevent the animal from throwing himself too violently, and I only recommend puncturing when the animal is considerably inflated. If he is not inflated you may injure the coats of the colon or cœcum.

Enteritis is perhaps more common in the horse than in any other animal, and also more fatal. It is inflammation of the intestines, and inflammation used without any particular application is a very vague term. The coats of the intestines are three—a mucous, a muscular and serous; and enteritis, in most cases, is inflammation of the mucous coat; but in many cases all the coats are involved. Some writers say it is confined to the muscular coat without the mucous coat being affected. But in some cases, as soon as you cut into the abdomen you can see a great change has taken place, both in the muscular and serous coats; and in other cases you may only notice a slightly reddened condition until you have cut through the muscular coat, and then the mucous coat is found to be affected. It is a very painful and alarming disease, which will run its course quickly, causing death in six or eight hours, and does not often linger more than from ten to twenty hours. It attacks the large oftener than the small intestines, but if it supervenes acute indigestion it may involve almost the whole of the intestines, and in other cases only a part or the whole of the colon.

Causes.—Colic occasionally produces it, although some writers say it does not. It arises from an over-accumulation of feces in the intestines, or eating some food to which the animal is not accustomed—

some hard body, clay, anything that will irritate the intestines. Pea straw is a common cause in some places. It may also cause colic. Purgatives incautiously administered in certain diseases may cause enteritis, and when croton oil was combined with almost every purgative, enteritis was more common. And I may just say that the less you use croton oil in practice the better. In other cases it comes from drinking stagnant, putrid water. I think this is a common cause in some places. Exposure to the cold, especially after a long and exhausting drive, and then standing in the cold; or it may come from calculi intussusception, volvulus, etc., and may supervene certain diseases, as strangles, pneumonia, etc., from a weakened condition of the system.

Symptoms.—Somewhat similar to colic and other painful bowel troubles, but in some cases it is preceded by dullness, especially if it is the result of faulty feeding. The first symptom often noticed is, pawing, first with one foot and then the other foot, and he may do this for an hour or an hour and a half; he may turn the head to the side, then cringe some, and again look at the side. This is also symptomatic of colic, but if it continues for an hour or two, and then lies down, it is symptomatic of enteritis; by and by the pain becomes more violent. Early in the disease the pulse is not much disturbed, but is slightly accelerated—perhaps forty, forty-two, or even forty-five per minute; and it is at the same time full and bounding; the mouth hotter than natural; the ears and legs hotter than usual, etc., it is symptomatic of enteritis, and sometimes rigors is the beginning of the disease; the coat is staring, the same as in congestion of the lungs, but the breathing is not so quick; the pain increases; he begins to move the limbs, cringes and lies down more carefully than in colic; tries to balance upon the back; gets upon his feet, and instead of standing still, as in spasmodic colic, he turns around, goes around two or three times, cringes and lies down. But if it is spasmodic colic, he will likely stand still for half a minute or more, and the pain is almost (but not absolutely) continuous in enteritis. The eye has a peculiar luster, becomes reddened and injected, and the same is true of the mucous membranes; the ears and legs may now be cold, or hot and cold alternately; and costiveness is another symptom. Although there may have been slight diarrhea in the first stage, and although you could move the bowels, it would not relieve the difficulty, as is sometimes supposed. There may be some hard feces passed, which may be covered with mucous, and attempts are made to urinate frequently, and some urine may be passed. In the early stage the belly is somewhat tucked up, and pressure upon it increases the pain, while in colic it relieves it, and after a time there is perspiration about the flank, behind the ears and shoulders, and a peculiar breathing, and if an animal has suffered some time from abdominal pain, and there is this peculiar breathing, it is a dark case, and the symptoms increase in violence, the pulse runs up to eighty per minute, loses its bounding character and becomes weak, then you may make up your mind that a considerable amount of exudation has taken place, and a well marked symptom at this time is the amaurotic expression of the eye, and as it advances the animal becomes almost blind and almost unconscious, and if you lift the head, the animal may fall back. This is caused by a lack of blood to the head, and you must approach him with caution. These symptoms may have been going on for from six

to fifteen hours, when all at once the animal may become quiet, perhaps take some food, but does not masticate it; the perspiration continues, the extremities are deathly cold, the mouth clammy, which shows that gangrene has taken place, and the animal may live two, or even ten hours, but generally dies in an hour or hour and a half, according to the intestine affected.

Treatment is not successful, but we sometimes meet with a case that may be treated with success, and opium is the great sheet-anchor, so to speak, of treating it. I recommend giving large doses of opium—a drachm dose of the powder every hour or two until four or six doses have been given; or, give two or three grains of the acetate of morphia hypodermically, repeated in half the dose in an hour or a half hour, if necessary; and it may be necessary to give injections, and I think there is benefit in counter-irritation; use ammonia or water—I believe hot water is the best. You may give Flemming's tincture of aconite in ten or fifteen drop doses, and you can give larger doses in enteritis than in any other disease. Blood-letting is another remedy, and I believe in some cases is of benefit, but it must be done in the early stage of the disease, and in a horse of good condition; but if the inflammatory action has poured out an exudation, then any such things should be carefully used, and use gentle stimulants with sweet spirits of nitre, opium, ale, beer, whisky, etc.; and although the bowels do not move, you need not be alarmed, but in some cases of constipation, which is setting up irritation, a purgative may be given, which may remove the constipation and relieve the irritation, and, in connection with the purgative, nux vomica may be added. There is another method of treatment, which I do not say is successful: it is to put the animal under the influence of chloroform, or hypodermic injections, keeping him under its influence for perhaps an hour, and I think it is worthy of trial. Be sure and keep the animal warm, well clothed, and rub well, to equalize the circulation; and when treating a case, and have given two or three doses of opium or hypodermic injections, the animal holds the head up some, then cover and keep him warm, but do not push medicine too far. It is as necessary to know when to quit giving medicine as to know when to give it.

Volvulus is also occasionally noticed. It is the bowels becoming twisted; or it may be due to colic, or a small portion of the intestine may pass through a small rupture in the mesentery, interfering with the passage of the contents. It is more likely to occur in young animals, but it may occur in an adult. It is almost impossible to diagnose it correctly, but the

Symptoms are similar to those of enteritis, but are more prolonged; the pain is continuous; there is obstinate constipation; the pulse becomes quicker and quicker; he throws himself about; you perhaps administer opium without any lasting effect; he sits upon his haunches; the pulse runs high and becomes almost imperceptible; sweats cover the body, and if you are certain of volvulus, it is best to destroy the animal.

Intussusception is a slipping of one part of intestine inside another. It is rather rare in the horse, but a young horse is more liable, and it is oftenest found in the small intestines, and sometimes a great length may become invaginated.

Causes.—It is hard to say just what does cause it. Violent contractions of the intestines during the severe paroxysms of colic may produce it. Foals feeding upon milk are more subject to it. If it occurs in colic each paroxysm slips it further, and death generally results, but cases are recorded where a considerable amount of intestine has sloughed off, and the case recovered, both in horses and cattle. Little can be done for it; however, some recommend cutting into the abdomen, find and endeavor to straighten out the parts, but this is not likely to meet with success, and if there is intussusception with strangulation it is generally best to destroy the animal, but it is possible for it to slough off and the animal recover.

Symptoms are common to this: volvulus, gorged stomach, etc.

Compression, or Stricture of the Intestines, may be due to tumors, which grow to a great extent and cause stricture, or you may have a tumor internally which may produce either stricture or volvulus, and opiates will not relieve it. The pulse becomes weaker and weaker, the animal sits upon his haunches, then lies down and stretches his head out, gets up and lies down, etc., and the symptoms remain for twenty-four hours or longer. It is generally not enteritis, because the animal would not live so long in acute enteritis. Strangulation may proceed from a pedunculated or ovarian tumor.

Intestinal Concretions are enlargements or balls in the intestines. They sometimes consist principally of lime or some other alkaline substances. They vary in size from that of a marble to the weight of twenty pounds. A small piece of almost anything may form a nucleus around which these substances may be deposited. In the specimen here a small piece of brass wire formed the nucleus. They have been called dust balls in England, because the horses were fed from the sweepings of the mill floors, and so got something to form a nucleus for the deposit. Semi-digested food sometimes forms a ball, and it takes sometimes perhaps years for it to accumulate to any great size, but sooner or later it will obstruct the passages of the feces, and cause death. There are also hair balls, which are composed of hair. Sheep sometimes have balls composed of wool; they may exist some time before they interfere with the animal. I believe that the animals in which they are present are attacked with what is supposed to be colic, which may be due to the obstruction, and the enlargement may move and the symptoms subside. These enlargements are oftener lodged in the colon than any other part of the intestine. When they obstruct the passage there is obstinate constipation, the pulse forty or forty-two; by and by the symptoms become similar to entiritis, but are more prolonged; he sits upon the haunches; the last is symptomatic of volvulus, intussusception, gorged stomach, calculus, concretions, etc., and if a horse has been suffering acute pain for several hours, and has the above symptoms, cold sweats, etc., it may be any of the diseases spoken of.

Treatment.—If the pain is violent endeavor to relieve it with opium, and it is good practice to examine the rectum by introducing your hand carefully, and you may find some hard body, or it may be from obstinate constipation. It is generally from twenty-four to thirty-six hours before death takes place after the bowels are completely obstructed.

Constipation.—In many cases this cannot be said to be a dis-

ease of itself, but a symptom of some other disease, but it is sometimes a disease of itself, and may proceed from various causes; from intestinal concretions; an undue amount of feces in the intestines; from too rapid or from too great absorption of the fluids, and from liver disorders; and when the animal suffers from any fever there is constipation; also inferior food of any kind; a large amount of oats and a small amount of hay; and pea and barley straw, etc. The muscular fibers of the colon and rectum become paralyzed to a certain extent, and are not able to expel the feces. Feeding over-ripe grass causes indigestion, and is liable to affect the brain in many cases, but roots are more liable to produce acute indigestion, flatulence, etc., than obstinate constipation.

Symptoms.—If it is a pure case there is scarcely any feces passed, the animal is dull and sluggish, slightly tympanitic in some cases, and shows more or less abdominal pain, but not much; lies down, rolls, looks at the sides; the pulse not much changed, perhaps forty or fifty; and by examination you may find the rectum completely impacted, and it may be necessary to remove the contents every day for some time.

Treatment.—If the bowels are obstinately constipated give a dose of purgative medicine, and it is good practice to combine with stimulants; give six, eight, or nine drachms of aloes, or one drachm of calomel, once, twice, or three times a day, or nux vomica, and give injections, and, if necessary, remove the contents of the rectum with the hand. Use an infusion of tobacco—one ounce of tobacco, cut up, and pour boiling water over it, and strain it through a cloth, then add a little soap and lard, and inject, which will cause relaxation of the bowels; if there is pain give an opiate, or hypodermic injections; I would prefer the latter. Or, instead of tobacco, use turpentine in water for injections, one-half ounce to one ounce. You may cause irritation by using too much soap in injections. If you make up your mind that it is a pure case of constipation, never hesitate in giving a dose of aloes, and follow by a diffusible or nervous stimulant. There might be an exceptional case, where you might have recourse to croton oil, and if so, put two or three drops inside a ball, and give it carefully, and do not let the animal chew it.

Habitual Costiveness, where there is slight constipation, is best treated by regulating the food, or by any mild remedy, such as carbonate of soda, but if it is due to some disease of some organ, as the liver, then you may have recourse to potassium. Purgatives may relieve for a time, but it will return; however, in some cases you may give a slight laxative, linseed oil, castor oil or sweet oil.

Diarrhea consists in the undue passage of liquid feces, due to a slight congested state of the alimentary canal. It is most frequently seen in horses of a weak conformation, as a narrow chest and loins.

Causes.—Giving rich, succulent food after having been fed on a stimulant diet for some time, and such a case may benefit instead of injuring the animal. Turnips, carrots, etc., especially if frozen slightly, are apt to produce it; also impure and stagnant water, which acts as a blood poison; or some irritant in the food, as sand, clay, etc.; or it may result from excitement, in race and hunting horses; or it may be the result of an over-dose of purgative medicine, or of the incautious administration of a moderate dose, and when it

is so caused it is called superpurgation. Diarrhea is not very fatal; it is often an effort of nature to relieve some disease, as in a poison in the blood the readiest way to get rid of it is by way of the bowels. If it results from pneumonia, influenza, strangles, impure or stagnant water, then it becomes serious. It is easily detected; the animal passes a large amount of feces, which are of a liquid nature; at first the pulse is but little affected, but after a day or two it becomes weak and slightly increased—if it continues longer the pulse increases; the ears and legs are colder than natural. There are slight griping pains in some cases, due to slight irritation, or perhaps to slight spasms of the intestines; these pains may increase and result in enteritis, especially if it is caused by superpurgation.

Treatment.—In many cases all you have to do is to change the food, and clothe the body according to the temperature; and it may be necessary to give a little medicine. Endeavor to find the cause, and if it is due to some irritation of the intestines, an astringent would do more harm than good; but cause the removal of such irritant by giving a laxative, combined with opium, a pint of linseed oil and a half ounce of laudanum; or, two drachms of aloes, with an equal amount of gentian, ginger, or any antacid; but if not due to an irritant, you may give an astringent; also, cover the animal, stimulate the legs, and sometimes the abdomen. But if diarrhea has continued some time, it is necessary to stop it.* Give catechu, half ounce to one ounce; gentian, two drachms; ginger, two drachms, and repeat it in from twelve to eighteen hours; or, oil of turpentine, one ounce; opium, one drachm, with two or three eggs; or, you may be able in some cases to check it with flour, but you must be careful in superpurgation, and it is best to give one drachm of opium and then give tepid water, which tends to soothe and restore the intestines to their natural condition. Do not resort to too powerful remedies at first. I treated one case in which I detected sand in the feces, and gave a laxative, and I think there was almost a bucketful of sand passed during twenty-four hours. You must get rid of any irritants, and if necessary give stimulants—good port wine and brandy, if the animal is depressed or takes no food.

Diarrhea, in young animals, is sometimes difficult, and sometimes results from a foal being exposed to the cold, or an improper condition of the milk of the mother; either too rich or too poor will produce it.

Symptoms.—An undue amount of liquid feces; the animal weakly and sickly; the coat staring, and perhaps a sort of curdled fluid passes with the feces; and it is necessary to be extremely careful in giving laxatives. You may give one to two ounces of castor oil with a little rhubarb, and endeavor to regulate the condition of the milk, if it is too rich, by giving a moderate amount of food, diuretics, or even laxatives. If the milk is poor, improve by giving a nutritious diet. In working the mare, the udder becomes full, and perhaps overheated, and if the foal is allowed to take the milk while in this condition, results in diarrhea. Give a slight laxative, and if you are not able to check it in this way, give a scruple of powdered opium, half drachm to one drachm of rhubarb, half drachm to two drachms of prepared chalk, and attend to the condition of the

* Findley Dume gives the dose one to three drachms of catechu.

mother; and use judicious counter-irritation, by rubbing and stimulating the belly with mustard or camphorated liniment.

Dysentery, or Flux.—This is an affection of the mucous membrane, especially of the large intestines, and there is a great tendency to ulceration, and when it takes place there is more or less hemmorrhage.

Causes.—It may proceed from a severe attack of diarrhea, or from grazing upon wet, marshy lands, or feeding upon grasses grown upon such lands; using impure water, etc. In cattle it is usually associated with tubercular disease. Horses do not often have it, except from some well marked cause.

Symptoms.—The evacuations are tinged with blood, and have an extremely fetid odor, which differs from an ordinary case of diarrhea; the feces are often mixed with shreds of mucous membrane; the appetite impaired or entirely gone; the pulse perhaps fifty per minute, and weak; there are colicky or griping pains, which, after ulceration, are not so severe; the rectum is also usually in an irritable state.

Treatment is not satisfactory in many cases, but give a slight laxative—castor oil and linseed oil and laudanum, and then small doses of chalk and opium once or twice a day, and demulcent drinks, as hay or linseed tea, flour gruel, etc., which will support the system and soothe the irritation of the bowels; or, you may try catechu, and after the discharge is arrested, then give tonics—iron will do very well—acetate of lead, one to two scruples, once or twice a day, has been recommended by some in controlling this disease. If the animal becomes very weak, support him by stimulants. In cattle the treatment is similar, but is not satisfactory, because it is generally associated with tubercular disease. There is one thing recommended by some having considerable experience: it is opium, one drachm; chalk, one ounce; calomel, ten grains.

Rupture, or Hernia, is the protrusion of an organ or part of an organ from its natural cavity. I will direct your attention to abdominal hernia, which is a protrusion of some of the intestines out of the abdominal cavity, either through a natural or an artificial opening. It gets distinctive names from the parts through which they protrude. If they protrude through the inguinal canal, it is inguinal hernia. If it extends down into the scrotum, it is scrotal hernia; if through the umbilicus, it is umbilical hernia; if through an artificial opening it is called ventral hernia; if through the diaphragm, it is diaphragmatic hernia, etc. Again, if you are able to return the parts easily, without any violent means, it is called reducible; if it cannot be so returned, it is called irreducible, and if it becomes constricted at the neck and interferes with the circulation, it is called strangulated. Scrotal hernia is more liable to occur in a stallion, and any part of the intestines may pass through, but it is generally the small.

Causes.—In many cases it is congenital; violent exertion may produce it. Inguinal may become scrotal in a stallion, from covering mares, leaping, running, or any violent exertion, and sometimes when thrown for an operation, by struggling. I will first speak of inguinal hernia, which may be easily overlooked, and so long as it does not become strangulated you may not be able to detect it at all. When it becomes strangulated the symptoms are just the same as

colic, but are more prolonged; the pulse becomes quick; he sits upon the haunches, rolls and tries to lie upon the back; the pulse becomes quicker and quicker, and if you have a case where such symptoms are prolonged it is good practice to look for hernia.

Treatment.—So long as inguinal hernia does not interfere with the animal it is just as well to let it alone, but if it becomes strangulated you may be able to reduce it by manipulating the parts, or you may have to perform by throwing the animal and elevating the hind quarters, extending the limbs to a certain extent, and insert the hand into the rectum, and by traction upon the bowels, and manipulation externally you may be able to reduce it. This operation is called the taxis. If this does not succeed, then cut down upon the hernia as close to the ring as possible, then make an incision into the hernial sack, and then reduce it and keep the animal quiet, and if you are able to return it in proper time the irritation will soon disappear.

Scrotal Hernia is easily detected. When the hernia is composed of intestines, it is called enterocele; if it consists of the omentum, it is called epiplocele. The omentum usually does little harm. If it is the intestines, they are apt to be distended with gas, and it will give way to pressure; if it is omentum, it is some harder, and does not give way as if it were gas, and may be mistaken for scirrhouscord or hydrocele, or a varicose condition of some of the veins. If there is no irritation, the animal does not suffer much. If the bowels are full, the feces pass down and enlarge the hernia to some extent, and it is smallest when the animal has been fasting. Cold contracts the tissues and so lessens the hernia; heat relaxes and enlarges it. It may be as small as two or three fingers, or as large as a man's hand, or even extend more than half way down to the hock.

Treatment.—If you are consulted about a valuable stallion, six, eight or nine years old, it is generally best to leave such a case alone, unless there are signs of irritation. "Let sleeping dogs lie." It may exist for years and do no harm, if the animal has good care and proper food; but if it attains considerable size in a horse not used for covering purposes, then treat it. Hernia in colts, extending down two or three inches, can usually be easily returned, but if such a case does not interfere with the animal, it is best to let it alone for a time, and it will often disappear of its own accord; but if it does not disappear, then it is necessary to operate. Suppose it is a colt, one year old, with a large hernia, then it is not advisable to cut into the hernial sac, but the best way is that recommended by Prof. Williams. Having the colt prepared by feeding sparingly for a few days, then return the intestine into its place, take up the testicle and scrotum and place a clam right over the scrotum and testicle, as close to the ring as possible, and allow the parts to slough off. The covered operation is performed by cutting in and exposing the testicle, still covered by the tunica vaginalis, make a small incision into the sac, then divide the stricture, replace the intestine and apply a clam over the scrotum, cord, etc., and allow sloughing to take place. I treated one case where the hernia extended two-thirds of the way to the hock. I first prepared him by feeding sparingly for a few days—gave oats without much hay—then threw the horse and tried to reduce the hernia before attempting to operate, and finding I could reduce it, I decided to operate by returning the bowels and applying a large clam as close to the ring as possible. The next day the pulse was about

fifty per minute; was reduced some the day following this, and in a short time the parts sloughed off, and a recovery was the result, and I do not think this could have been successful by the covered method. Sometimes it is necessary to operate on a colt without castrating him, and a truss may be used, and it may subdue the hernia. However, there is one method I have resorted to in such cases, which I have not seen recommended particularly in our works. I returned the whole mass of bowel up the scrotum, and put a few stitches through the scrotum, and left them for four or five days. A little irritation was set up, and the hernia disappeared. I was careful not to injure the testicle, which I had close up to the ring. Some recommend applying a clam below the testicle, which sloughs off a piece of the scrotum.

Umbilical Hernia.—This may occur in any animal, but is more likely to occur in young animals, and is often congenital. If not present at birth, it is noticed in a few days after birth. It is generally reducible with a little pressure. If in a colt from six to fourteen days old, it is just as well to let it alone for a while, and it will often disappear, for the omentum does not grow as fast accordingly as the other parts of the body, which tends to reduce it. But if the colt is one or two years old, then it will not disappear of itself, and it is necessary to reduce it, and there are various ways, as by a truss, or a bandage is applied, and it is more easily applied than in scrotul hernia. In other cases you must operate by some of the methods; by cutting through the skin; expose and scarify the abdominal walls, and bring the parts together. This would be perhaps the most surgical way, but we can operate in a more simple way, and I recommend throwing him. Return the bowel, take up the skin and apply the clam right over it, taking care not to apply them too tightly, and so stop the circlation too quickly; or, you can use skewers instead of clams; put two or three skewers through the parts, and take good, strong twine and secure the parts by passing the twine over them in the form of a figure eight, or by puckering up the skin and applying a ligature around it; and a skewer is of benefit in this case to prevent the ligature from slipping off. In twenty-four or thirty hours it is necessary to apply another ligature, and tighten the parts up some, and you may subdue the hernia. And perhaps in eight or ten days tetanus will set in and death result, and this may occur after any operation, and peritonitis supervene; but there is not generally much danger of peritonitis.

Ventral Hernia.—It may vary from the size of a marble to the size of your head. It generally results from direct injury, as a kick, etc., and sometimes from abdominal contraction; but it does not often occur in this way, and it is well, in examining horses, to look along the belly for enlargements. It is a fluctuating tumor, and when produced by injury it may be due to extensive inflammation set up in the part, giving rise to an exudation, and matter may form, and you will have to open it up; and there may be a hernia as well as an abscess, and when opening an abscess in this region, always think of a hernia, and be very careful. The same thing applies to cattle, and you may have difficulty in making up your mind what is hernia or an abscess, or both together. One of our graduates opened an abscess in this region; it formed again, and he plunged the lancet into it, and there was

a hernia present, and it was necessary to destroy the animal. They may attain a great size and not interfere with the animal; and it may be a point of dispute whether it should or should not be operated upon; and unless the owner desires it, it is better to let it alone.

Treatment.—Prepare the animal by moderate feeding for a day or two, then throw the animal and return the hernia; cut into the sac and bring the edges together by a catgut suture. There is no great danger in a small hernia, if the animal is prepared for it, and it may be necessary to put him under the influence of chloroform. Operate just the same as in umbilical hernia, and use skewers to prevent its slipping; or you can operate by skewers, and even a blister, in some cases, may reduce it. You may also use the ligature, or operate by cutting into the hernial sac and scarifying the walls, and secure the edges by means of a carbolized catgut, and then bring the skin together. I think this is preferable to the metallic suture.

Diapragmatic Hernia.—This is rare, and, sooner or later proves fatal. It may either pass through a natural or an artificial opening. It is apt to enlarge and soon produce death. It may proceed from various causes—from violent exertion of any kind, and sometimes from colic. It is difficult to diagnose, but there are

Symptoms that might lead you to suspect it. I will give you the history of one case I attended. He showed symptoms of inflammation of the bowels. I learned that during the previous night he had suddenly become ill, and continued so during the night. In the morning the pulse was quick, full and bounding; sweats covered the body; he would lie down and get up; the respirations were greatly increased, and he appeared to be suffering from inflammation of the lungs. This continued more or less during the most of the day, and the usual remedies for enteritis were used, without success. Later in the day he became quiet, the pulse was scarcely perceptible, the mouth cold and clammy, the mucous membranes became pale, and there was labored breathing; he again had pain, and again became quiet, fell and expired. A post mortem revealed more than thirty feet of the small intestines in the thoracic cavity. I believe the cause was colic. Nothing can be done for it.

Rupture of the Colon, either in acute indigestion or flatulent colic, giving rise to symptoms similar to rupture of the stomach—the nose pale, mouth clammy, etc.

Rupture of the Rectum may occur, and recovery may take place. It is not uncommon, but is rather a serious injury. It may be caused in various ways—by a foreign body passing in, or mal-address in serving mares. If it is confined to the superior walls, especially if posterior to the peritoneal covering, a cure may be effected; but if anterior, through the peritoneal covering, and in the inferior part, death generally results. Make a careful examination, insert the hand carefully into the rectum and remove the contents, which is better than giving an injection, in this case, and endeavor to find the extent of the injury; and you might endeavor to bring the parts together, but it is difficult to do. Keep the patient extremely quiet and feed very sparingly. You may sponge the parts nicely, and you may give a slight laxative of oil. If there is pain, give hypodermic injections or powdered opium, and give tincture of aconite.

Tumors and Abscesses in the Rectum.—A constipated state of the bowels may so irritate the parts as to cause an abscess. Rudely inserting the hand, or the incautious use of the injecting pipe may cause it, especially in a violent case of the colic; or you might even rupture the rectum in this way. An abscess gives rise to great pain. After defecation he may cringe down, and even lie down and roll. Examine such cases, and you may find an abscess or tumor; if an abscess open it, and then carefully inject with astringents and disinfectants to a certain extent. Regulate the diet, and give opium if the pain continues. Ulceration of the walls of the rectum is more liable to occur in old animals; nothing can be done for it; as a general thing it is of considerable extent, and may be eaten through the walls. If it is but slight, treat with carbolic acid, and attend to the general health of the animal; give tonics, good food, etc. Tumors in the rectum may interfere with the passage of the feces. Endeavor to remove them, either with the knife or ecraseur.

Protrusion of the Rectum is often met with in all animals, and it looks very formidable, especially to a casual observer, and if it contiues for some sime it swells and becomes inflamed, and may attain a considerable size. It is caused in various ways, and is symptomatic of acute indigestion. In other cases it is due to a slight injury to the rectum—from inserting the hand violently. It is also brought about by exposure to cold; by irritating clysters, using too much soap, or even by giving clysters too frequently; from diarrhea or constipation, and in some cases debility; or the animal standing with the fore parts higher than the hind parts. In the dog it may be produced by aloes. The most common cause, perhaps, is constipation. It requires a little tact and perseverance to reduce it. Endeavor to find how long it has been protruded. Bathe with tepid water to remove any dirt, scarify in one or two places, being careful not to cut too deeply, then bathe with tepid water and laudanum, aud if it is from constipation it may be necessary to remove the contents of the rectum, by giving an injection and allowing it to escape, then bathe well and return it, and you may meet a case where you will have to return it every day perhaps for a week or ten days, and if due to constipation it is sometimes necessary to give a purgative to get the bowels in a natural condition, then elevate the hind quarters to a certain extent. Sometimes a portion may become gangrenous, when you will have to remove the gangrenous part, and recovery may still take place. It has been recommended to place a truss to the parts, but it is difficult to do.

Imperforate Anus, in which the skin covers the anus; and this condition may extend in for a considerable distance. Make two incisions, one across the other; but if the anus is not developed properly, death will soon result.

Peritonitis.—The abdominal cavity is covered with a serous membrane, reflections of which cover the various organs. Inflammation of this is called peritonitis, and is rather a serious affair, and is apt to lead to serious results. This and enteritis may both occur at once. However, it may exist independent of enteritis.

Causes.—Exposure to cold; food is not likely to produce it; exposure after some debilitating disease. It often supervenes enteritis, and

is often a sequel or a result of castration, especially if not properly performed; from a change of weather, etc.

Symptoms are somewhat deceptive, and it may go on to some extent, especially if it is due to an injury, and be overlooked. There is not the same pain as in enteritis; the pulse is perhaps seventy or eighty, and wiry, the breathing affected to some extent, and you are apt to think the horse is suffering from irritation of the lungs; pressure causes pain, and in many cases, no difference what causes it, a post mortem will reveal a great amount of effusion into the peritoneal cavity. The symptoms sometimes come on gradually. At first he is dull, will not move unless he is forced to, refuses food; pulse seventy or eighty, and wiry; the breathing quickened some, and he will look at the sides, etc. It is apt to extend over a large surface, and may involve the whole peritoneum. When it comes from castration, suppuration does not take place in connection with castration, and instead of healthy, we have a small amount of ichorous pus discharged.

Treatment.—Hypodermic injections, opiates and a little oil if the bowels are constipated, and judicious counter-irritation, and after partial recovery use iodide of potassium.

Ascites, or Dropsy, is the result of peritonitis. An effusion takes place from an inflammation of a serous membrane, and if it goes on to such an extent that it can not be absorbed, it produces dropsy. Dropsy is the result of chronic peritonitis, or from chronic disease of any of the organs—as the liver, lungs, heart, kidneys, urinary, calculi, albuminurea, or degeneration of the kidneys, etc.

Symptoms.—The animal is weak; the pulse quick, and very weak in some cases; the appetite may be retained tolerably well; the muscular system becomes soft and flabby; the belly distended, and when you press upon it you can see it is the result of a fluid; as well as being weak, the pulse is irregular; there is, perhaps, a slight diarrhea, and when there is, the symptoms subside to some extent; then constipation sets in, and the swelling again returns. This disease is most common in the dog, and it is astonishing how much fluid may be imprisoned in a dog.

Treatment.—Give those remedies that will tend to absorption of the fluids; support the strength; encourage the appetite, and do not restrict the diet, but give any good food that will be taken; and give iodine and iodide of potassium, of each one drachm; or acetate of potash, two or three drachms, night and morning, and if the effusion is very great, the operation of paracentesis may afford temporary relief. This is easily performed by means of a trochar and canula. However, this operation is not followed by any great degree of success, for the fluid is likely to collect again. It is sometimes, also, necessary to apply a bandage. If the effusion is but slight it will be absorbed; if it is too extensive to be absorbed, there is not much success in treating it.

Gut Tie is occasionally noticed in working oxen. It gives rise to pain and obstinate constipation; he looks at the sides, etc. Some have afforded relief by cutting into the abdominal cavity and unraveling it. It is difficult to diagnose. The stomach of the ox is divided into four stomachs, or divisions. The first is the rumen, or paunch; the second, the reticulum, or honey-comb; the third, the omasum, or

many plies; the fourth, the abomasum, or true digestive stomach. The food is taken into the mouth and masticated to a certain extent; it is then swallowed and passes into the rumen; when the rumen is full the process of rumination commences. There is some difference of opinion about this process. Some claim it is performed by the rumen, and others that it is done by the second, and some by the third stomach; but some ruminants have no third stomach, so it must pass from the rumen up the œsophagus, and, after being remasticated, it is again swallowed and passes through the œsophageal canal into the omasum and true digestive stomach.

Hoven Blown, or Tympanites.—This is common, and consists in a distention of the rumen from the accumulation of gases, due to the suspension of the peristaltic action of the stomach. The gases are carbonic acid, sulphuretted hydrogen, and carburetted hydrogen gases, and, in some cases, carbonic oxide.

Causes.—It is sometimes a symptom of choking, sometimes the result of chronic indigestion, and may be symptomatic of disease of the liver, parturient fever, etc. The great exciting cause is a sudden change in the food. In some countries wet clover will produce it quickly, and in those places it is very dangerous to turn cattle upon wet clover in the morning. Potatoes and turnips, especially if frozen a little, or feeding peelings, etc., from the kitchen; bran, shorts, etc., and any kind of food may produce it. In the acute form it is not usually accompanied by any organic disease, but is the result of the evolution of gases.

Symptoms in many cases are alarming. The left flank swollen to a great extent, and there may be eructations of gas in the early stages. Rumination ceases; there is a drum-like noise from striking the swelling, and from pressure upon the diaphragm the breathing is disturbed, and the animal may die from asphyxia; the head is protruded, and even the tongue may protrude from the mouth; the eyes bloodshot, the animal staggers, falls, and expires, mostly from asphyxia, but it may be from rupture.

Treatment.—This should be energetic. Give something that will neutralize the gases, and form different compounds—carbonate of ammonia one-half ounce to one ounce, or the aromatic spirits of ammonia, which tends to combine with the gases. Another is chlorinated lime, two to four drachms or even an ounce. Any of these should be given in cold water; but I prefer two, three, or four ounces of turpentine, and raw linseed oil from one-half pint to one quart in ordinary cases; and it may be advisable to follow with a purgative—give from one pound to one and one half pounds of epsom salts. If the symptoms are very urgent, you must relieve mechanically, which may be done with a hollow probang, but the safest way is to puncture upon the left side, at equal distance from the last rib, the transverse processes of the vertebra and the spine of the ilium. The trochar used for the horse does very well, but it must be pretty long; after puncturing give a little turpentine and oil, and it is good practice to follow by a purgative, and attend to the animal carefully for some time. Give the best of food and tonics. If you have no trochar use a small knife.

Impaction of the Rumen, Grain Sack, Etc.—It means an excess of food in the rumen; it paralyzes the muscular coats of the

rumen, and suspends digestion; inferior food of any description is liable to produce it. An animal getting loose at corn, oats or bran, especially if inferior, and not first acted on by hot water, is liable to it. Corn cobs will also cause it.

Symptoms.—I think there is generally more or less gas present; rumination ceases; the animal is dull, and suffers pain to some extent; there is a peculiar groan or grunt heard; the pulse is quick; sometimes there is a discharge of saliva from the mouth; he lies down, gets up, lies down, etc.; the left side is swollen, and instead of the hollow sound, it is a dead-like sound, and by pressure you find food is in the rumen, and you can leave the marks of your fingers upon the outside; the bowels are costive, and if there are any feces passed they are covered with mucous. Food may remain in the rumen for days, or even weeks, in a case where there was impaired function of some kind. Sometimes it is thought the animal is choked, and in passing the probang it will not pass into the stomach because of the food.

Treatment.—I recommend a dose of purgative medicine, followed by stimulants. Give one to one-and-a-half pounds of epsom salts, half ounce of ginger, dissolved in hot water, and give when cooled; or you may combine one-half ounce of aloes with it. It is necessary sometimes to give a large dose of purgative medicine. I have given three or four pounds of salts before it would operate, but I think you are more likely to have success from stimulants. Strangeways recommends quinine with the purgative, and nux vomica may be of benefit; and if these fail, you may perform rumenotomy; and we are apt to let a case run too far before we perform this; it would be more successful if performed at an earlier stage. Rumenotomy is cutting into the rumen and removing its contents, and is best performed when the animal is standing; and if the animal has been affected for some time, you can cut to a considerable extent without the animal seeming to care. So secure the animal against the wall, cut through the skin and muscles in the same place you would puncture. (Some recommend plunging the knife through all at once). Make an incision about five inches long, exposing the rumen; then make an incision in the rumen and insert a handkerchief, or attach the walls by means of a suture, to prevent the food from passing into the abdominal cavity, and then remove the contents carefully. Some recommend leaving some food in, but I generally clean it out pretty well, then bring the walls of the rumen together. A metallic suture is the best, perhaps, and bring the edges so it will slough into the stomach, then bring the other parts together and give a slight purgative, and stimulants, if the animal is weak. In a case where you give one or two good doses of purgative medicine, then depend upon stimulants; injections are also of benefit.

Ejection or Vomition can take place more readily in cattle than in horses, but does not frequently occur because they are not easily nauseated. It may arise from various causes, as irritation of the reticulum, abomasum or true digestive stomach, but is generally due to some foreign body therein and a great many things may be found in the stomach, taken in by a depraved appetite, as old shoes, clothes, bones, etc.), and possibly it may occur from some organic disease, as a tumor. It is best treated by a slight laxative, as there is a possibility of the foreign body being removed. Give six or eight

ounces of epsom salts with a pint of linseed oil, and support the animal upon liquids for a few days, gruel, linseed tea, etc, and if the irritation still continues you may give a small dose of opium to allay the irritation; but there is nothing, perhaps, that will allay the irritation as quickly as hydrocyanic acid, fifteen, twenty, or thirty drops two or three times a day. If these do not afford relief and you think there is something in the rumen, it may be advisable to open and explore the rumen with the hand, but you must exercise judgment in such cases. Foreign bodies often get into the rumen, pass out and through the diaphragm, and passing into the substance of the heart, produce what is known as traumatic pericarditis.

Hair Balls occur in all animals, but oftenest in cattle. They are likely to accumulate and remain in the reticulum. They occur from animals licking one another. They attain considerable size, and set up irritation; in some cases they may pass out or break up; they give rise to indigestion, loss of rumination and ejection. The rumen may contain one hundred and fifty or more pounds of food. Almost all sorts of foreign bodies have been removed from the stomach of the ox. Youatt relates a case where a lady's neckkerchief formed the nucleus for a calculus. A case is also related where a coat was found in the stomach of a slaughtered ox; and a snake three feet eleven inches in length was taken from the œsophagus of an ox, after puncturing had been performed without any permanent benefit.

Impaction of the Manyplies, at one time called fardel bound, and also supposed to be of common occurrence, for if an animal suffers for a week or two it is often impacted to a great extent. I believe, with Professor Williams, that it is often symptomatic of other diseases, but it does, however, occur as a primary affection. There are about one hundred or one hundred and twenty of these leaves, and the food becomes impacted between them until it seems almost as hard as a bone, or the ingesta gets dry, and will crumble when a post mortem is made.

Causes.—Giving dry food which does not contain nutriment in proportion to its bulk. It is more common in the spring, when the animal is turned on an old pasture, and in getting the young grass he gets a large amount of old, indigestible grass, and it may occur from inferior food, frozen roots, etc.

Symptoms.—There is a manifest loss of fat, and, if in a milch cow, there is a decrease in the flow of milk; perhaps at first a slight diarrhea, which speedily gives way to costiveness; the mouth hot; the ears and horns usually rather hot; the pulse quickened; the muzzle dry and hot; the breathing increased. And this is apt to lead you to suppose the animal is suffering some slight affection of the respiratory organs. There is a slight moaning, and cases are sometimes mistaken for pleuro-pneumonia, especially in those stall fed. There is also a grating of the teeth, and the head becomes sympathetically affected by the nervous system becoming affected, and this produces tremors, convulsions, and, perhaps, death. The rumen is generally not distended to any great extent, and there may be a tucked up appearance. The first sympton often noticed is the cessation of rumination.

Treatment.—Give a good purgative, and follow it by stimulants, or follow by quinine, one or one and a half drachms, and a few drops of sulphuric acid, which dissolves the quinine. If the animal will drink,

give plenty of water, and give chloride of sodium with the salts; give gruel, linseed tea, etc., but so long as the acute symptoms last there is no great need of much food, for if the digestive organs are not in a condition to receive it, it does more harm than good. You may give an ounce of aloes with the epsom salts, and, if the fever is great, give a few doses of aconite. I do not recommend blood-letting.

White Scours, a form of diarrhea in calves. It is usually the result of irritation of the stomach more than of the small intestines. It is a common disorder. I think there is more or less inflammatory action in connection with the true stomach. It is gastritis, so to speak. The exciting cause is the character of the milk, although there may be exceptional cases, where there is a tubercular diathesis. It is often caused by giving the young calf milk from some other cow, instead of the first milk of the mother, and even the milk of the mother may not be of the right character, and so cause it; another cause is giving skimmed milk.

Symptoms.—The feces are in a semi-fluid state, a yellowish-white color; sometimes mixed with hard portions; the patient grates its teeth, which is symptomatic of abdominal pain; lies down; raises the head and looks toward the abdomen.

Treatment.—Endeavor to find the cause; regulate the bowels by giving good milk; and it may be necessary, although the animal is weak, to endeavor to get rid of the irritant by giving one, two or three ounces of linseed oil, with an equal amount of lime water; castor oil may be given, but linseed oil does very well. The lime tends to counteract the acidity of the stomach, and the oil allays the irritation. Bicarbonate of potash, one scruple to half drachm, or even a drachm, according to the size of the animal. If there is pain, give from twenty to fifty drops of laudanum; and astringents are sometimes required, but must be used with extreme caution. Give catechu, half drachm, and prepared chalk, one to two drachms, or some flour gruel. If the milk is either too nutritions, or the opposite, change the food of the mother, and in this way act upon the milk.

Inflammation of the true digestive stomach may be produced from various causes; anything that will cause impaction of the third stomach may produce this—roots, corn, grasses, tares, fitches, etc. Symptoms are somewhat similar to fardel bound. There is diarrhea, followed by constipation; the respirations increased; the muzzle dry and hot, or hot and cold, and legs in the same condition.

Treatment.—Give a moderate laxative, and carefully use sedatives, and attend to regulating the diet; and you are apt to mistake fardel bound for inflammation of the true digestive stomach.

Diarrhea in Cattle is due to a slight congested state of the alimentary canal, from an irregular supply of water, impure water, etc. It is apt to terminate in dysentery, which is more common in cattle than in horses. There are liquid evacuations, tinged with blood, and sometimes mixed with shreds of mucous membrane. Endeavor to find the cause; give a slight laxative, and follow by astringents, if necessary; treat the same as in the horse, but do not at once give astringents in diarrhea. It is sometimes a prominent symptom in tubercular disease.

Enteritis in cattle is not so common as in horses. There is

more or less abdominal pain; pulse quick; grating of the teeth; suspension of rumination, etc. It does not prove fatal so quickly as in horses, and cattle do not show such violent symptoms as horses. It is treated in much the same way as in the horse. Be careful in giving purgatives; give hypodermic injections, opium or laudanum; support the animal, and use counter-irritation, which must be stronger in cattle than in horses, because the skin is thicker; there is also twisting of the bowels, but it is not so common, and does not destroy the animal so quickly as it does the horse, but it is likely to prove fatal.

Constipacion is not so common in cattle as in horses, and is most likely to occur in well-fed cattle. Feeding well upon turnips, corn, etc., and also mill sweepings, may produce it. Cattle are more liable to disease of the large intestines, and horses to disease of the small intestines. It is possible for a portion of ingesta to remain in the stomach of a cow for a long time. A case is recorded where a cow was fed fitches and then removed to where she could get no such food for six weeks, and a post mortem revealed fitches with the ingesta. And when you make a post mortem and find the third stomach impacted, do not make up your mind in all cases that the animal died from impaction.

DISEASES OF THE LIVER.

Disease of the Liver is not very common in the horse, yet we occasionally meet with a well-marked case, and in post mortems we find lesions in connection with the liver that were not detected through life. There are many reasons why the horse is not liable. One is, that the horse has no gall bladder—but I do not think that this has anything to do with it, but I think that the simplicity of their living has. Liver disease is the result of eating, and climate tends to exert an influence, for it is more common ir hot countries.

Congestion of the Liver may and does occasionally occur, and it is more likely to occur in a horse fed on a stimulating diet and getting but little exercise. But it may exist with other causes—as disease of the valves of the heart, which affects the whole system, to some extent, and usually the liver; and also in chronic disease of the lungs. Chronic emphyseina has been said to cause it, but we have seen horses with the heaves live for some time and show no signs of liver disease. If it proceeds from heart disease, it produces passive congestion of the veins, and sometimes of the arterial vessels; but a stimulating diet is the most common cause—a large amount of corn, oats, etc.—and doing but little work.

Symptoms.—They are not very plain, and you will have trouble in diagnosing it. The attack is, perhaps, somewhat sudden, but before this perhaps the animal is dull; the bowels disordered; slight diarrhea, and then costiveness; slight abdominal pain, but not such as in colic or enteritis; it is shown by more or less restlessness, turning the head and looking at the side—more to the right than the left, some say; the pulse quick, and, in some cases, weak; and after a time the secretion of the liver is interfered with, the result of which is yellow-

ness of the mucous membranes, and, although he suffers pain, he does not lie for any length of time, especially if the capsules of the liver is affected, but stands up much the same as in lung disease; but in lung disease the quickened breathing and changes can be detected by auscultation and percussion.

Treatment.—If it occurs in a pampered animal, give from seven to nine drachms of aloes. I do not recommend calomel. However, in some cases it is a benefit, in others it is injurious. Apply judicious counter-irritation, and you can scarcely ever go far wrong in applying heat to the abdomen, even if there is difficulty in making up your mind. Sulphate of magnesia is another remedy, but do not give a purgative dose; or you may give, instead, sulphate of soda, which acts as a febrifuge. Give glauber or epsom salts in the water one to three times a day. Another good one is iodide of potassium; regulate the diet. Congestion of the liver is more common in sheep than in horses, and may produce softening or disintegration, which is due to the feeding, especially if fed on a stimulating diet. There may be no signs till shortly before death; then there is pain; the animal rolls, perhaps; the mucous membranes show a yellow tinge, and the post mortem shows the liver enlarged; has a yellowish appearance, and can easily be broken between the thumb and finger. There can be but little done for it, but if you are called, and find that several have died, make a post mortem and try to find the cause of the death, and you may prevent it in others by giving a less stimulating diet—the sulphate of soda, or the hypo-sulphite of soda, iodide of potassium, a slight purgative, etc. It is more frequent in dogs, usually the result of being pampered, fed upon sweets and getting but little exercise. He refuses food; seems weak and debilitated; there is a yellowish tinge of the mucous membranes; and if in a light-skinned animal, the whole skin is yellow. Give a good purgative of jalap or syrup of buckthorn, then iodide of potassium; regulate the diet and give some exercise. Feeding nothing but cold water for two or three days, and giving exercise, will often cure it in dogs.

Hepatitis, or Inflammation of the Liver, may either be acute or chronic. It may involve a part or the whole of the organ, but in most cases, in the horse, I think it only involves a part, and suppuration may result, and an abscees of the liver, which may result either from circumscribed or diffuse inflammation.

Symptoms.—The animal shows pain by looking at the sides, lying down, etc., but does not roll in a violent manner, although some works say he does. In other cases he stands most of the time; the breathing slightly affected; the pulse quick; the head turned to the side; the inner side of the lips, cheeks, etc., assuming a yellowish tinge, and the feces are covered with mucous; the brain may become sympathetically affected, causing staggers, etc. Another symptom is lameness in the off fore leg. You may meet such a symptom, but do not attribute it to the liver unless the lameness is very obscure. It is said that such lameness has been caused by a foreign body in the liver. There will be a scanty supply of urine, and it may be tinged with bile.

Treatment.—If the pulse is strong, give a few doses of sedative medicine; but if it is weak, then give stimulants; also give a moderate dose of laxative medicine; then give iodide of potassium or nitrate of potash, and improve the system by regulating the diet, and give tonics; but be careful with purgatives in any case where the animal is debil-

itated and the appetite gone; but perhaps a small dose of nitrous ether, and injections are useful. It is more apt to occur in a circumscribed than in a diffuse form, and it may go on to a considerable extent before there are any well-marked symptoms. It is more common in old, debilitated animals.

Jaundice is perhaps the most common disease of the liver. It is often only symptomatic of some other disease. It is symptomatic of any disease of the liver, of inflammation, hardening, calculi, hydated abscesses, etc., and it may prove a sequel of some debilitating disease, as influenza, strangles, etc., by exhibiting a yellowness of the mucous membranes, and of course is jaundice. In man it is of such an extent as to stain the linen of the patient, and may arise from various causes; it may arise from suppression or obstruction. By obstruction, by closing of the hepatic duct, from inflammation of the lining membrane; obstruction by calculi, gall stones, tumors, hydatids, etc. It may be due to closure of the hepatic and common duct, resulting from adhesive inflammation, gall stones being firmly impacted therein, or anything that will obstruct the flow of bile. Another cause is destruction of the hepatic cells, as in atrophy and induration of the liver, etc. There are certain tests by which you can form an idea of which of these it is. Take two drachms of urine, add one-half drachm of sulphuric acid and a small amount of loaf sugar—a piece the size of a pea—and if at the line of contact of the two liquids a scarlet or purple color is produced, the acids of the bile which are only secreted by the liver are present, and it is due to obstruction. If some of those ingredients which are only found in the liver are absent, then the sugar takes on a brownish appearance, and it is due to suppression. But I do not say this is always a true test. There is yellowness of the mucous membranes, the pulse weak, a furred condition of the tongue, the secretions generally impaired, appetite impaired, etc.

Treatment.—Give a moderate laxative, iodide of potassium, and then tonics. If there is suppression then perhaps there is benefit in calomel, but I do not recommend it in all cases. If the animal is strong give a laxative; if not, give stimulants; if in summer give nice green food in small quantities, and carefully use stimulants. The dog also suffers from jaundice; give a moderate laxative, regulate the diet, and recovery will usually result.

Rupture of the Liver.—It is occasionally seen in a horse ten or twelve years old, that has been highly fed and exercised but little, and if put to violent exercise it causes hemorrhage and death. The

Symptoms are internal hemorrhage; the animal falters, shows pain, looks at the sides; the pulse runs down quickly, perhaps is strong for a few minutes at first; the mucous membrane becomes pale and blanched, and a post mortem will reveal a rupture of some of the vessels; perhaps a small vessel may be ruptured and the animal live for some time. If you suspect rupture apply cold water to the sides; give acetate of lead, one scruple, once or twice a day. It is very difficult to diagnose an internal rupture, but you may be able to do it. I have known rupture of the heart to occur, and death is almost instantaneous. In other internal ruptures death occurs in about twenty to fifty minutes.

Biliary Calculi, or Bile Stones, are not so common in the horse as in man, but they may exist in great numbers, and when they do they generally give rise to the obstruction of the flow of bile, causing it to be reabsorbed into the system, and this gives rise to jaundice; therefore jaundice may be a symptom of biliary calculi. There may be perhaps ninety or more of these present at one time. These may set up irritation and cause ulceration of the biliary duct, and irritation of the intestines as well. Persons living high and taking but little exercise are liable to these. If you suspect these, which will be shown by yellowness of the mucous membranes, irritation, etc., try the effect of a slight laxative of oil or aloes, and follow by one-half drachm to one drachm of hydrochloric acid, well diluted, two or three times a day. It has a tendency to dissolve the calculi, and there is no great risk in trying it, as it is not likely to do any harm.

Atrophy of the Liver also occurs; and also the contrary, or hypertrophy. The horse gradually falls off in condition; the digestive organs become impaired; there is diarrhea or costiveness; the feces become changed in color, although the animal has been fed upon the same kind of food; by and by there is yellowness of the membranes. This may run on for some time, and the horse still be able to do some work.

Scirrhus Induration is more likely to occur in old horses, and in most cases is the result of faulty feeding. In man it is often the result of the continued use of intoxicants, especially of a poor quality. The animal falls off in condition; there is irregularity of the digestive organs; yellowness of the eyes and mouth, and the animal dies a lingering death. No doubt if the urine in such a case had been tested by Harley's test, it would have shown that there was suppression present. But little can be done for it; regulate the diet, and use iodide of potassium, etc.

Functional Disorder of the Liver, without any actual disease being present, is occasionally seen, as in indigestion. Bile is not secreted properly; and a slight yellowness of the membrane appears, costiveness, etc. A convenient term for this is torpidity of the liver. Give those remedies that tend to increase the secretion of the bile; calomel has such a tendency; give one scruple to one-half drachm every day for four or five days, and follow by a slight laxative; regulate the diet and give tonics, but do not give tonics till the system is prepared for it. An irregular supply of salt tends to produce liver troubles.

Rot in Sheep is due to a fluke worm, distoma hepaticum in the duct and even in the substance of the liver. The liver presents a reddened appearance, the tissues are disintegrated, etc. I do not think it exists to any great extent in Canada; it may exist in the southern part of the United States. In Britain it is common, and destroys millions of sheep. The ovum of this worm is taken into the stomach and gets into the duct, and gains access to the liver, and after remaining there for some time it changes and escapes by way of the intestines, then undergoes various changes and produces an ovum which may again be taken by the sheep in their water. These parasites are developed to a great extent in the liver, and usually give rise to pain.

Symptoms.—It is said that the animal thrives for some time after the worms are deposited. After a time the wool is easily pulled and an odematous swelling takes place under the throat; yellowness of the eyes, etc. The shepherds in Britain can determine it just by the appearance of the eye. It is usually the result of pasturing upon wet lands.

Treatment.—Prevention is better than cure. Move the animals from low to high lands, and give hypo-sulphite of soda and plenty of common salt; and the giving of turpentine is worthy of trial. This disease is more common in wet years.

Spleen.—This is the largest ductless gland in the body, and its function is not very well known. It may be removed from the lower animals, and the animal live and enjoy pretty good health. The spleen, as other organs, is liable to inflammation, but is more liable to congestion. Splenic apoplexy occurs in cattle, and the horse sometimes suffers from congestion of the spleen, which may be followed by inflammation.

Splenitis.—Diseases of the spleen are hard to diagnose correctly. An animal may suffer severe pain internally for several days, and then death takes place; and a post mortem may reveal an inflamed or gangrenous condition of the spleen. I think it is more common in malarial districts, and I think that the horse suffers from malarial fever. I knew one horse in particular, that was owned down near New Orleans, showed slight indigestion, dullness, could not stand work, etc., and was sold very cheap; was taken to Minnesota, and became one of the best horses in America.

Symptoms are similar to colic, and when a horse shows slight symptoms of colic, rolls, etc., and gets up apparently well, it may be that he is suffering from irritation of some other part. In diseases of the spleen, the pulse is quick, and I think tolerably weak; and in some cases, before the acute symptoms appear, the animal is dull and languid, showing that the disease was coming on gradually; the animal has a great tendency to hang the head and lop the ears; but this is symptomatic of any debility. Inflammation of the spleen is supposed to be more common during summer. I have never seen a well marked case of it. If you suspect it, give opiates and a gentle laxative, and use counter-irritation, and after the acute symptoms are allayed, give iodine and iodide of potassium. In any case of abdominal pain you cannot make any great mistake in giving opium or hypodermic injections. I believe the spleen is more liable to chronic than acute diseases, except in apoplexy. It is liable to hypertrophy, I believe, in malarial fever, as it is in ague. It is difficult to detect, and is determined by negative symptoms; the animal pines away without showing disease of any organ. There may be softening, rupture and melanotic deposits. The spleen has been found enlarged, and varying in weight from twenty to eighty-eight and a half pounds. It is also liable to a kind of ossification or cartilaginous change, and the symptoms are similar to the foregoing; the horse becomes weak; the appetite impaired, but not entirely gone; gradual emaciation ensues; the circulation not much disturbed; the pulse perhaps forty or forty-four, and weak; and although the animal gradually falls off in condition, the coat will remain as sleek as in health, which is an exception in debility; the bowels are irregular, and the horse is not able to

do much work. If you examine the lungs, they are regular, and there are no abdominal sounds; you examine the urine, and find the kidneys all right; there is no yellowness of the membranes, and the symptoms which I have mentioned are present, then you may conclude that it is the spleen. Enlargement has been detected by examining *per rectvm;* but to do this, it would have to be enormously enlarged. If you suspect this, give a slight laxative, and then try iodide of potassium—one or two drachms once or twice a day; or, give iodine itself. You may have dropsy in connection with this.

PANCREAS AND SPLEEN.

The character of the diseases of the pancrea is somewhat obscure. Death may occur, and yet we are unable to diagnose the disease—but it is rare. When the secretions of the pancreas are impaired, the fatty principles of the food pass off unchanged. This is seen in the human being and in the dog. The animal falls off in condition; there is weak pulse and more or less abdominal pain; fats pass unchanged; pancreatic calculi are also found—more frequently in cattle; the large and small ducts may be affected by them; it is more likely to occur where the water is largely impregnated with the salts of lime. Treat it by changing the food and water, and give mineral acids. It is very hard to diagnose correctly, and when you go into practice, and your patient dies from anything out of the regular order of disease, always make a post mortem examination.

Splenic Apoplexy in Cattle should perhaps come under "anthrax." This is rather common in cattle. It is an enlargement of the spleen with blood, which interrupts its vital function, and causes disease. Recent researches have thrown some light upon the subject, but it is still a large field for investigation. It is a blood disease—the constituents of the blood are changed to a considerable extent. The blood, from various causes, undergoes peculiar changes, and is brought to a stand-still in the spleen.

Causes.—It is now held that it is due to the presence of the bacillus anthracis—small spores which enter the blood in some way or other, either through the digestive system or through a wound. This is the opinion generally held, but I think we meet with cases where it is hard to account for it in this way. However, these spores may be carried in different ways. I have seen a few where, I think, it could scarcely be attributed to these spores, although it is now generally admitted that these cause it. The exciting causes are changing from poor to rich food; a deficient supply of water, although it is pure, and pasturing the animals upon low, damp lands in hot weather; at one time plenty of water, which becomes scarce and changed in character. Water containing a large per cent. of solid matter is liable to produce disease. I saw two or three cases in the neighborhood of Paris, in the summer of 1872, which was dry and hot. They received an irregular supply of good water. Some of them died, and post mortems revealed lesions of the spleen, presenting all the symptoms of splenous apoplexy. Then they received plenty of water, and no more were attacked. It has been noticed where animals have been fed upon

turnips which were grown upon certain soils or manures; but I am inclined to think it is due to spores getting in in some way. If you meet with it, examine the character of the food, pasture, etc., carefully.

Symptoms are alarming and of short duration. An animal may be apparently perfectly healthy at night and be dead in the morning, but he may have been affected for some time, for it is noticed that the temperature is increased before other symptoms are shown, and after the pains increase the temperature becomes less than natural. Then the animal shows uneasiness; the urine is high colored, and is said, in some cases, to be streaked with blood; the pulse small and thready; the breathing accelerated and stentorious; the head affected in various ways; sometimes comatose, at others convulsions, and sometimes the animal will bellow with pain, and the symptoms are no sooner revealed than the animal is dying. Nothing can be done in the way of treatment, but change the locality, food and water, and make a thorough investigation of all the food, and give a slight laxative. Try hyposulphite of soda as a preventive. Decomposition takes place quickly after death. When you make a post mortem it is best to do it as soon as possible. Under the skin it looks like the animal had been bled to death, and sometimes there is ecchymosis in the intestinal canal. The spleen will be increased in weight two or three pounds, and will be full of blood, and if held up the blood will gravitate from one end to the other. The blood is also changed in character. Sometimes there is a discharge of a kind of frothy mucous from the nose, and it is sometimes tinged with blood; and sometimes a similar discharge takes place from the vagina. One farmer, near Brockford, has lost in the past four years nineteen head of cattle, in which case I am satisfied it is of a local character; but at the same time it may be due to those spores. I think we have congestion of the spleen, which terminates fatally, that is not due to the bacillus anthracis. I would recommend you, in making post mortems, to be careful, especially after decomposition sets in, if there are any sores upon the hands. I do not think it is very dangerous, but a certain amount of caution is necessary. If you meet with it, change the locality, give laxatives, stimulants, tonics, etc.; carbolic acid is also recommended.

DISEASES OF THE KIDNEYS.

Nephri is, Inflammation of the Kidneys.—The kidneys are the great eliminators of the system, and as we cannot act so readily upon the skin in our patients, we frequently act upon the kidneys. Nephritis may occur in the acute or chronic form, and is more often sub-acute, or chronic, in the horse. Disease of the kidneys is often suspected where it does not exist—as in rolling, looking at the sides, showing pain, etc. These do not always indicate disease of the kidneys, but sometimes do, and you will be called to treat what is supposed to be disease of the kidneys, which is not. In enteritis the kidneys are affected to a certain extent.

Causes.—Exposure to cold; food possessing diuretic properties too largely; musty food of any kind which over-stimulates the kidneys and causes more or less inflammation; eating certain herbs, grasses,

etc.; suppressed perspiration; also, diuretic medicines in too large quantities—sweet spirits of nitre, rosin, nitrate of potash, etc., if too much is given, or if it is given too frequently. It is also said to result from violent exertion of any kind, especially with a heavy weight upon the back. But in most cases it is due to the food, medicines, or exposure to cold. It may terminate in resolution, softening, or enlargement, of the kidneys; but when it goes on to any great extent, the lining membrane of the uriniferous tubes passes off in the urine, which destroys the character of the kidneys to a certain extent, and it may terminate in ulceration and poisoning of the blood, when it is usually fatal.

Symptoms.—More or less fever; the pulse varying from sixty to eighty, and it is not the full bounding pulse of enteritis; the mouth is hot and dry, more perhaps than in some cases of enteritis. There is considerable pain in the region of the kidneys, and more or less abdominal pain; he lies down and rolls, but not to the same extent as in enteritie, and does not try to lie upon the back; turns the nose to the flank, but puts it higher up; the ears perhaps alternately hot and cold; the breathing increased; frequent attempts to urinate, passes perhaps a small amount of high colored urine, which looks like it was mixed with blood, which may be possible, and it may contain casts of the uriniferous tubes. The urine may be retained for a short time in the bladder. If the disease goes on and relief is not obtained, the symptoms change some; the pulse becomes weaker and weaker, the coat changes, the horse looks dull and stupid, showing uræmic poisoning, and if both kidneys are affected, and their secretions arrested, this results very soon. After passing urine the pain is sometimes increased; all the secretions are more or less affected. Azoturia is often mistaken for inflammation of the kidneys.

Treatment must be energetic; a sedative is recommended. Formerly bloodletting was the remedy used, but fifteen, twenty or thirty drops of Flemming's tincture of aconite is better; and give an oleaginous purgative—one quart of raw linseed oil. To relieve the pain you may use opium or hypodermic injections of morphia; also injections not only to cause the bowels to act, but tepid water has a good effect upon the kidneys. Clothe the body well and endeavor to induce perspiration. Slight perspiration around the flanks and shoulders is symptomatic of the disease. Apply hot cloths, mustard, etc., over the loins, and a newly flayed sheepskin is an old and good counter-irritation. Sometimes blister, but do not use cantharides, for it tends to over-stimulate the kidneys; it may be used in azoturia. Pressure over the loins is a test for kidney disease, but is uncertain, for any thin-skinned animal will flinch from pressure here, and the kidneys are deep-seated and well protected, but it may increase the pain. It is also recommended to examine *per rectum*. After the symptoms subside some, regulate the diet and give a few doses of carbonate of soda. At one time it was recommended to give calomel. You may give belladonna instead of opium in some cases.

Nephritis, I believe, often occurs in the sub-acute or chronic form, and is caused by poor keeping and hard work, or a large amount of diuretic medicines, which over-stimulate the kidneys. But a slight amount of urine passes; the horse rolls about and is uneasy; stands with the hind limbs well back; there is slight swelling of the limbs, the urine sometimes nearly natural, and some-

times streaked with blood; the pulse is not affected to any great extent. Give a slight laxative; regulate the diet; give demulcents, and give carbonate of soda; use counter-irritation, hot water, mustard, etc., but no cantharides. Williams recommends the application of digitalis over the kidneys; also give tonics. We are often consulted about a case of some slight irritation of the urinary organs, which may be due to functional disorder of the kidneys, or to overstimulation by diuretics, and it is well to ascertain whether such medicines have been given. In such cases give a few doses of tonics, as sulphate of iron, and in eight or ten days give a diuretic. Some recommend tartar emetic to act upon the skin, but it is not reliable, and in fact there are no certainly reliable medicines of this kind in our practice. Inflammation may terminate in resolution, suppuration, induration, atrophy, or hypertrophy, and when one kidney becomes affected the other is apt to take on just the opposite condition. If one becomes atrophied, the other becomes hypertrophied, etc., and disease may exist in one kidney for some time without producing death; even suppuration has been noticed in some of our subjects.

Polyuria, Diuresis, Diabetes, Insipidis.—It is classed as a dietetic disease, and I think it is just as well to notice it in connection with the urinary organs. Pure diabetes is where the food is converted into sugar and passes off through the kidneys, and I think it is better to use the term polyuria or diuresis. There is an enormous amount of aqueous urine passed; it is more watery than in health; it is of low specific gravity, and contains an excess of urea and chloride of sodium, and some other acids are said to exist.

Symptoms.—The principal one is the great amount of urine voided, which is clear and watery; this sometimes occurs to a slight extent, and we can scarcely give it the name of a disease. It is sometimes just what we desire. If there is irritation of the respiratory organs we give medicine to act upon the kidneys, and it is not then called a disease. The cause that generally gives rise to it is some error in feeding, and so it is classed as a dietetic disease; inferior food, as musty hay, oats, beans, peas, etc., are causes. It is also a sequel to some debilitating disease, the result of some change of tissue in the system. It is sometimes the result of strangles and influenza, and is not a bad symptom unless it continues for more than two or three days. It is said to be a premonitary symptom of glanders, and that is quite possible from the change of tissues. It is also said to be produced by drinking impure water, and the continued use of diuretics.

The Symptoms are essential and incidental. The essential are intense thirst—it seems that you cannot satisfy the thirst—a case is recorded in which a horse drank thirty-eight gallons of water in five hours. The horse is dull; the appetite impaired, but not entirely gone; a copious secretion of clear urine, of light gravity. The incidental symptoms are such as are common to indigestion—a dry, dusty coat; hide-bound (hide-bound is not a disease, but symptomatic of disease); the circulation is not much affected, but exercise affects it more or less; after a while the pulse becomes intermittent, and death may take place from anæmia, or it may terminate in some other disease.

Treatment.—Inquire as to the kind of food, and change it, and if in the summer, give green food. If this cannot be done, give a certain amount of cooked food. I use Dick's remedy: One drachm of iodine

each day for four or five days, and change the food. It acts like a charm. Where there is great thirst, give plenty of good, pure water —give it frequently and in small quantities. If these fail, give mineral and vegetable tonics, powdered opium, carbonate of soda, the tincture of iron, etc.; or, sulphate of iron, one drachm; arsenious acid, two or three grains; mix and give once a day; or you may increase it to two doses a day; or try the tincture of the chloride of iron. Williams noticed that when iodine was given for glanders, there was not any great desire for water—hence the use of iodine. If it occurs as a sequel of some debilitating disease, the treatment is similar.

Ischuria.—We use this term for both suppression and retention of urine. True ischuria is where it is secreted and retained; false, is where it is not secreted. It is, no doubt, symptomatic of nephritis, or anything that will interfere with the secretion of urine. Suppression may proceed from functional inactivity of the kidneys; from fevers of any description, which interferes with the secretions of the kidneys. When it is just functional inactivity, give those remedies which act directly upon the kidneys—give one or two ounces of nitre, in water; or a diuretic ball of rosin, nitre and soft soap. True ischuria sometimes appears where the urine is secreted and retained in the bladder, and the bladder may become greatly distended and give rise to well-marked symptoms in many cases; and it is serious, as it may lead to paralysis, and even rupture, of the bladder. It may be due to spasms of the neck of the bladder; or to calculi; or, in old animals, to enlargement of the prostrate gland.

Symptoms—The animal attempts to urinate; stamps with the feet; turns the head to the side; lies down and gets up, etc., and almost groans with pain when attempting to urinate. If it is a horse, the penis, in some cases, hangs pendulous. Sometimes a horse shows a difficulty in urinating when there is no abnormal condition of the kidneys. This sometimes occurs from want of straw or other bedding under him. As a general thing, you can have conclusive evidence of retention by examining *per rectum*. A nice clyster of warm water will sometimes relieve it by a relaxing action. If it is due to spasms, or even if due to calculi, sometimes pressure upon the neck of the bladder with the hand will relieve it. If these fail, then use the elastic catheter, which can be inserted up the penis. Take hold of the penis with the left hand and insert it carefully, and when it reaches the point where it has to make the turn, use a little pressure, and you may even need to pass the hand into the rectum to prevent it from passing into the ejaculatory duct. In passing it in the female, put the hand in and find the meatus urinarius; raise the valve and insert the catheter. In the passage there may, in some cases, be some difficulty, but not as a general thing. As well as this, a good opiate will sometimes afford relief in spasms of the neck of the bladder; or give hypodermic injections; or a few good doses of belladonna may be of benefit; and you may even inject the bladder with a little tepid water.

Cystites, Inflammation of the Bladder, is seldom seen, except from difficult parturition; but exposure to the cold, diuretic medicines and bad blood may produce it. The animal walks with a straddling gait; the urine is passed frequently, but in small quantities at a time—but there may be the natural amount. An examination may show pain and heat in the parts. Keep the animal quiet;

give an oleaginous purgative; inject the rectum, and even the bladder, with tepid water, to which may be added a little opium, which can be done in either the horse or mare; give a few doses of carbonate of soda, and follow with demulant drinks, etc.

Fungoid Growths in the Bladder, either cancerous or melanotic, may grow and almost fill up the bladder. Ureters become enlarged, and take on the functions of the bladder, to a certain extent, by becoming enlarged. Hard work and poor keeping favor their production. Old horses, so kept, are most liable to this.

Symptoms.—The animal appears somewhat stiff in the quarters, but not actually lame. This disappears some by exercise; he gradually loses flesh until he is unable to do any work; the pulse is not affected; strains violently when urinating, and the urine may be tinged with blood, or blood may be noticed after the urine is passed, in some cases, and the urine in such a case may be almost natural. Make a careful examination *per rectum;* also examine the condition of the blood. The passage of blood after the urine is also symptomatic of calculi. In such cases little can be done—but you may try the effect of medicine. With this you occasionally find small calcareous deposits; hence, you may try hydrochloric acid, one-half to two drachms, well diluted with water, two or three times a day. Cutting in and removing these is not successful. Melanotic deposits are more common in gray horses. You may detect hypertrophy *per rectum*, if it is exceedingly large.

Albuminous Urine, Albeuminurea.—It is often symptomatic of other diseases. It is an excess of albumen in the urine. It is seldom noticed in the horse. It is sometimes the result of acute nephritis, but may appear without any organic disease of the kidneys. It may result through nervous influence, by derangement of the digestive system.

The Causes are exposure to cold, improper food, etc., and it is most likely to occur in horses worked hard and exposed to the vicissitudes of the weather. So long as a horse is well kept and well cared for, exposure does not affect him so much. In man it is often brought about by nervous excitement or hard work, especially nervous work. The animal loses condition and flesh, has an unthrifty appearance; swelling of the legs, which perhaps partially disappears during exercise; the appetite irregular; pulse weak; stiffness of the back and loins; costiveness, but not constipated; the urine straw-colored, and if tested albumen can be detected. Take a small amount of urine and apply heat (150° Farenheit), and the albumen coagulates if the urine is acid, and the coagulum does not dissolve by heat, but if it is alkaline you must add nitric or some other acid; no doubt it may sometimes act upon the urea and form a precipitate, but this precipitate will dissolve by heat.

Treatment.—Attend to the hygienic treatment, and do not expose the animal to the vicissitudes of the weather. Give perhaps boiled food, as boiled oats, barley, etc., and in some cases give a mild purge. But perhaps the animal is weakened; in such a case be careful with purgatives; but I think this is an exception to the rule, and I think a purgative is beneficial, especially if the limbs are swollen. For the after-treatment give sulphate of iron, one to one and one-half drachms, with arcenious acid, one to two grains. Then give vegetable tonics, and build up the system as well as you can. I knew a

case of a man whose limbs and testicles became swollen, and after various remedies had been tried without success—which acted violently, causing extensive watery evacuations—it relieved the man for several years. After it attains a certain stage it is incurable, for all the food is passed off through the kidneys instead of building up the tissues. It may, in some cases, be necessary to stimulate the kidneys to a certain extent.

Calculi may be found in all glands, but more commonly in the urinary organs. They are found in all animals in the kidneys, withers, bladder, and urethea. They are called renal when in the kidneys, and are generally in the pelvis of the kidney, but at first they may have formed in the tubes and come down and lodged in the pelvis. This may exist without any disease being present, but no doubt we occasionally meet with disease of the kidney, induration, enlargement, or tumors which may have been excited by calculi.

Symptoms.—The animal shows uneasiness and colicky pains, which pains, perhaps, disappear in a short time, and the animal is apparently restored to health. There is straining in passing the urine, and after it is passed there is pain, and if it exists to any great extent, the animal gradually falls off in condition, and if you examine the urine, the true character may possibly be seen by the sediment which is deposited after standing for some time. It is more common in cattle than in horses.

Causes.—The exciting causes are the food and water. It is said that animals fed on turnips are more liable. Calculi are made up of carbonate of magnesia, phosphate of lime, etc. I have noticed that where the water is strongly impregnated with the salts of lime the animals suffer more from this. Sometimes the animal may be in good condition and have calculi to a great extent—even remain in good condition until death. And it is possible that calculi may be present for a considerable length of time before the symptoms become well marked. The animal lies down, turns the head to the side, etc. Examine the condition of the urine, either chemically or by letting it stand.

Treatment.—Allay the irritation as well as you can by giving mucilaginous drinks—as linseed tea, etc.—change the food and water, and try mineral acids. Give from one-half to two drachms of hydrochloric acid two or even three times a day, well diluted in water, and, perhaps, give a moderate laxative. If it occurs in the urethra, it is called urethral calculi.

Vesiculæ, or Cystes, in the Bladder.—These vary in size. They may be the size of a pea or smaller, or they may weigh several ounces. They are caused by the character of the food. Horses highly fed upon stimulating food, and those used for certain purposes, and not allowed to urinate when nature demands it, are subject to it. The same causes that produce renal calculi will produce cystic calculi. A foreign body may prove a nucleus for them. They present different appearances—sometimes white and hard, and composed of carbonate of lime, and sometimes of a soft, pasty consistence. There may be a great number or only one, and, in many cases, they consist principally of carbonate of lime, but various things may enter into their formation, and, being often of lime, they are more likely to exist in limestone districts.

Symptoms.—They are generally plain. After a time something is noticed the matter with the animal, and irritation of the bladder is produced, and there is difficulty in voiding the urine, which, when passed, may be unnaturally white; he is subject to colicky or abdominal pains, which may pass off and again occur, when it again falls into the neck of the bladder, and so retains the urine, which causes pain. The action of the hind quarters is not quite natural; there is difficulty in urinating, and, when urinating, the penis is protruded to an enormous extent and hangs pendulous; and perhaps the urine is mixed with blood, or blood is voided after the urine is passed. In all such cases examine *per rectum*, and feel the bladder, and perhaps you may be able to detect it, and be able to move it from side to side; but sometimes they are encysted, when you cannot move them.

Treatment.—It is possible, in the early stages, to relieve it by regulating the diet and giving remedies to increase their solubility; so try hydrochloric or nitric acid; hydrochloric is perhaps the best, and if they are small they may be got rid of in this way. But in some cases there is an excess of acid, then try bicarbonate of potash; but if the calculus is large, the only remedy is by an operation; but do not operate unless it is of a considerable size and there are well marked symptoms, then prepare, by a moderate diet. Give no bulky food for a day or two, and have the bowels rather empty; and it is sometimes recommeded to give a purgative, but I do not think it is always necessary. There are various methods. At one time it was recommended to cut into the bladder, but now it is done by cutting into the urethra, or cutting through the neck of the bladder. I do not think it is necessary to cut through the neck of the bladder. It may be possible to perform it with the animal standing, but it is best to throw and secure him and place him under the influence of chloroform, and elevate the hind quarters to some extent; but perhaps before you throw him it is best to clear out the rectum by an injection or with the hand. Secure him by rope, the same as for castration, then insert the catheter up the urethra, up to the bladder; then cut down upon the catheter; or, you can have an instrument made, and slightly bent, for the purpose, upon which to cut. Williams recommends cutting in the center. I cut to one side, then withdraw the catheter, then insert the forceps and get hold of the calculi; but sometimes the after-results are troublesome, and there is danger of injuring the artery of the bulb, which it is said differs in its course in different subjects. After treatment, syringe with tepid water; stitch up the wound and keep the animal quiet. The trouble sometimes is the discharge of urine from the wound, and infiltration setting up irritation and causing death. It is difficult to say just what to do in such cases. I do not know but I would keep the catheter in, and allow the urine to pass; however, this is difficult to do in our patients. The operation is called lithotomy. But, properly speaking, unless you cut the neck of the bladder, you could scarcely call it this.

Lithotrispy is breaking down the stone, but owing to the great length of the urethra in the horse, we cannot perform this. In the mare you may perform by dilatation, even without any cutting in some cases. Get the forceps into the meatus urinrius; insert them carefully and get hold of and crush the calculus.

Sabulous Matter.—There is generally no great trouble in removing this. Perhaps the proper thing is lithotrispy—just crush it in the bladder.

Urethral Calculi pass into the bladder and lodge there a short time, pass out and lodge in the urethra, and may obstruct the passage, and if not removed, will soon cause death by uræmic poisoning or rupture of the bladder.

Symptoms.—The animal strains violently when he attempts to urinate; the penis protrudes; the bladder, and sometimes urethra distended; and in many cases you can see the exact spot of the obstruction by examining. The remedy is to endeavor to remove it by pressure, or by inserting the catheter; and if it is small, it may pass down and escape; but if you cannot displace it by the catheter, then you will have to cut down and remove it. Bring the edges of the wound together by a large suture, and keep the patient quiet; regulate the diet, and try the effects of hydrochloric acid. This is more common in cattle than horses, on account of the difference in the penis. The treatment is just the same.

THE BLADDER AND CASTRATION.

Inversion of the Bladder is a serious condition. It may be displaced both in the mare and the cow, and is generally the effect of difficult parturition, but it is possible it may occur from other influences. There is a small tumor noticed to extend from the vagina; the uters are brought back, and the urine dribbles down the posterior part to a certain extent. The remedy is to bathe nicely and endeavor to return it by manipulation and gentle pressure. But you may be unable to do this, and gangrene may have taken place. An animal may live for a long time in this condition, but if attended to in time it can usually be reduced. The after-treatment is to use opium, hot or cold water—cold is perhaps preferable, after a time, as it is an astringent and contracts the parts. If the parts are gangrenous, you may remove a portion, but the animal is comparatively useless, as the urine has a tendency to dribble from the ureters.

Enuresis—Incontinence of urine. The urine is not retained in the bladder. This is applied to any condition of the bladder in which it is unable to contain its contents. It may come from irritation of the bladder, and is symptomatic of calculi, inflammation of the bladder, or due to partial paralysis of the hind quarters, which also affects the bladder; but paralysis does not always so affect the bladder, and you may meet paralysis of the bladder, where the urine may be retained. In all such cases examine as to the state of the blood, and find what is the cause, and if due to general weakness, give a generous diet, mineral tonics, and use cold water frequently, from a quarter to a half hour at a time; and if due to paralysis, you may use nux vomica; if due to calculi, the remedy is to remove them. There are other names used in connection with diseases of the bladder. Ischuria, truly speaking, is retention, but it is used for both retention and suppression. Dysuria is a painful discharge of urine, and stronger where the urine is passed in drops. These are more symptomatic of disease than diseases themselves.

Paralysis of the Bladder itself is sometimes noticed in the horse, and generally proceeds from debility or exposure, but may be due to some other influence; over-distention may cause it, or nervous influence. It is more likely to occur in horses poorly kept.

Symptoms.—The bladder retains the urine, unless it is paralysis of the neck; if that is paralyzed, then the reverse is noticed; but if there is paralysis of the body of the bladder, it becomes distended to an enormous extent, while the fibers of the neck retain their power of contraction, and the urine dribbles from the urethra, which may mislead you, unless you make a careful examination as to the state of the bladder. You might think it was a pure case of incontinence, but if examined, the bladder may be found enormously distended.

Treatment.—Remove the contents with the catheter, then syringe the parts, first with tepid water, then gradually go from hot to cold; try the effects of tonics, especially nerve tonics, as nux vomica, and it may be necessary to draw the water once or twice a day for several days.

Hæmoturia, or blood urine, may proceed from various causes, and is symptomatic of other diseases, as calculi, or it may proceed from injury to the urethra, kidneys, etc., and it has been said to proceed from severe sprain of the loins, which causes rupture of some of the vessels; and such cases are serious, if the rupture is in the kidneys, for the blood will set up irritation, and is apt to produce inflammation. There may be blood in the urine, or the blood may be passed immediately after urinating. In such cases examine *per rectum*, and give an internal styptic, as acetate of lead, one scruple, with powdered opium; or, you may give the tincture of chloride of iron.

Castration.—There are a few countries where this operation is not performed to any great extent. The best age for the operation is when the animal is about one year old. There is some difference of opinion about this; but if it is done younger than this it may prevent his growth to a certain extent, and in some cases it may be advisable to keep him longer, to increase his growth, especially the crest. The spring months, April or May, are the safest time for the operation, after the animal has had a run of eight or ten days at pasture, and his coat is shed. There are certain precautions necessary before operation, which are well laid down in Williams' works, and I endorse them generally. Do not operate upon a colt that has been kept in an ill ventilated place, but have the colt in good condition, and the weather moderate, neither too hot nor too cold. He also says not to operate near any decomposing matter, and have the hands and instruments thoroughly cleansed; and it is well to notice these, but you might operate without these and with very bad surroundings, and have success; but it is best to use these precautions. If the horse is older than one year, then prepare him for it by giving a moderate supply of food, and have the bowels somewhat empty; but it is a mistake to reduce him to any great extent. There is no necessity for physic, as a general thing, unless the horse was in a very gross condition; but feed lightly, and give but little bulky food. The difficulty that I have had with colts is with those that have been kept in ill ventilated parts. Before operating, examine as to the state of the scrotum, whether both testicles are down, or whether hernia exists. You can operate, though, if hernia exists,

but the operation would be slightly difficult. There is great difference of opinion as to the manner of operating. Secure, by means of ropes, in preference to any other; the straps that are used may be used, if help is scarce; but when help is plenty, use the ropes. Some operate while the animal is standing, but it requires some dexterity and practice. Cutting into the testicle quickly subdues an animal. The most careful way is to throw the animal. I recommend throwing him in most cases, at least. After securing him, it is sometimes advisable to cleanse out the sheath and penis by washing it with nice warm water and soap, which tends to prevent swelling to some extent. The operation may be done by compression, which is by the caustic clams, and this is the way it is generally done in Canada and the United States, and I believe there is no way more easy and simple. Take hold of the testicle and make a keen incision, and expose the testicle, taking the smallest first; make the incision close to the raphe; make a pretty free incision, and allow the testicle to escape, then divide non-vascular part of the cord, and then apply the clam; however, some apply the clam to all of it, and they use a certain amount of caustic, as corrosive sublimate or biniodide of mercury, about one part of corrosive sublimate, two of biniodide of mercury, and thirty or forty parts of lard; this destroys the parts more quickly. After applying the clam remove the testicle, and keep the clam on for twenty-four or forty-eight hours. This method is the one oftenest used in this country, and with the greatest success.

Actual Cautery was used until recently in England. The method is just the same as by the clam: secure the animal, get hold of the testicle, etc., place the clam on the cord and secure it, then take hold of the testicle and cut it off about one-half inch from the clam, then take a piece of sponge and cleanse out the blood, then take a red hot iron, letting it cool to a slight extent—grease it a little to prevent it from adhering—and sear the artery and the other parts. Others not only arrest the hemorrhage, but cut through the scrotum to the testicle with the hot iron, apply the clam and cut the cord off with the iron. I frequently use actual cautery in connection with the caustic clam.

Ligature is another method, and I would oppose ligaturing the whole cord; but if only the artery is ligatured, I cannot see any great objection to it. Take hold of it with the bull-dog forceps and ligature it either with silk thread or the carbolized suture. Williams is opposed to ligaturing.

Tortion is another method, which is not new, but a very old method. For this it is necessary to throw the animal and expose the testicle and cord, cut through the nomascular part of the cord, place the clam upon the vascular portion, having drawn the cord out as you thought best (some are longer than others, so there can be no rule lain down); having secured it, take the tortion forceps, apply them carefully to the vascular part, about a half or a fourth of an inch from the clam; secure them and watch that they do not slip; then twist it around, testicle and all, and it will take from fifteen to twenty-five turns to remove it; twist it carefully and the last thing that remains is the artery; after removing it take a look at the artery, and then remove the clam carefully, to see whether the tortion has had the desired effect. About the only objection to this is, it takes a little more time. Williams recommends placing another clam upon the scrotum, to enable you to get hold of the testicle; but I see no need of it.

Ecraseur is another operation, which I think will be the one used in a few years, but I cannot speak of it to any great extent from my own experience. I operated upon three this way. I threw the horse and placed the clam upon the cord before cutting it off, to see the effect of it. There are also other methods, as scraping, bruising, cutting out a portion of the epididymus, etc. But the simplest method is the best, and if you have used any of the methods successfully, then continue the same. Although it is a simple operation, it requires some practice, and the great danger, in some cases, is pulling the cord too much, or applying too much caustic, which irritates the cord and sets up peritonitis; and the great secret is in having the animal in proper condition. Never operate upon any animal that is not in good condition, or that shows any symptoms of influenza, strangles, etc.

RESULTS OF CASTRATION.

Results of Castration.—They may be either normal or abnormal. After the operation there is more or less swelling, and although it may attain a great size, so long as the appetite is not impaired, or the pulse affected, there is no danger; but if the swelling takes on an odematous character, the best relief is to scarify in two or three places, then bathe with tepid water; give a little exercise, and if he is costive, perhaps, give a little laxative; but if the colt is turned on pasture this is not generally necessary.

Adhesion of the tunica vaginalis and tunica albuginea. It is necessary to break down the adhesion, which can generally be done with the finger or the end of the scalpel. When adhesion is present, a greater amount of irritation follows than where there is no adhesion. There may also be a slight pain after the operation, which may be from the cord, colic, or slight irritation of the bowels from the operation. If the animal cringes, lies down and rolls, it is best to give an opiate—opium, one-half to one drachm; or give hypodermic injections.

Suppuration is another condition, and it is impossible to operate without suppuration, more or less, and when suppuration takes place, and healthy pus is discharged, the animal is considered safe; and when pus is not properly formed there is more danger. Pus may form and not be healthy pus, and if there is unhealthy pus, or serum, and the pulse quickened, then there is irritation, and peritonitis may result.

Abnormal Results.—Suppose you have properly performed the operation and let the colt up, and hemorrhage exists, which may be from the spermatic artery, or from the veins of the scrotum, or from the artery of the cord. When you cut through you are likely to cut through the convolutions of the artery, and so have three or four ends, and you should see that you secure the right end. If the hemorrhage is from the spermatic artery, it runs freely, for this is the largest artery in the body that gives off no branches. As to the way of arresting hemorrhage of the spermatic artery, there is no difference of

opinion. If it is very profuse and endangers the animal, throw him and endeavor to get hold of the cord, which you can do easily, in many cases. If a good opening has been made in the scrotum and tunica vaginalis, put the finger well down and get hold of and gradually bring the cord up and secure it in the way you think best. The best way, perhaps, is to ligature it, or you may use the hot iron; but if you have difficulty in getting it, then endeavor to arrest it by styptics and compression, by plugging with tow saturated with iron or acetate of lead. However, there may be internal hemorrhage, but this is the exception and not the rule, and I would recommend this, in some cases, instead of throwing the animal. The plug should be left in for twenty four or thirty-six hours. Considerable swelling may result, but there are generally no serious consequences from it. Cold water to the loins, and to the parts, is also a method of arresting the hemorrhage. I questioned, at one time, whether an animal in good health, and one year old, would bleed to death from one cord, but I am now convinced differently. I would prefer styptics in some cases. Sometimes a secondary hemorrhage occurs from rupture of the cord above the clam, but it is rare.

Hernia is another abnormal result, and it may exist previous to the operation, or the operation may be performed and hernia not noticed until the animal gets up; and it is possible it may occur during the operation. When hernia exists, prepare the animal and use the covered operation—by cutting down and exposing the testicle still in the tunica vaginalis, and place the clam over the testicle, tunica vaginalis and all. If hernia takes place as soon as the animal gets up, the operator is often blamed; but it may occur during the operation. If you should begin to operate, and hernia is present, return the testicle and stitch up the scrotum, and do not operate at that time. But if it occurs soon after the operation, as it often does, so that the bowels protrude, even in some cases to the ground and are trampled upon, then destroy the animal; but if the bowels are not injured, throw the animal—or he will perhaps lie down—secure him, cleanse the intestines nicely and return them, and stitch up the scrotum close to the inguinal ring, and apply a clam over the scrotum, or if you have not a clam, ligature the scrotum for the time being, but if the intestines are impaired, inflammation and peritonitis may cause death.

Scirrhus Cord, or Champignon, may follow any method of operation, but is more likely to follow the caustic clam than any other, for it is necessary to keep the clams on for some time; after that the cord perhaps protrudes, causing more or less irritation; adhesion takes place between the cord and the scrotum, but we can scarcely call it scirrhus cord, unless it becomes enlarged. If in three or four weeks the cord protrudes and adheres to the edges of the wound, you can relieve it by breaking down the adhesions between the cord and scrotum, in some cases, without throwing the animal; then bathe nicely, use astringents, etc., and it may be necessary to break it down every day or two for several days, and bathe every day with tepid water for some time, and give a little exercise. Sometimes the cord becomes enlarged by a fungoid growth, and, in some cases, the wound may entirely heal up, or there may be a small opening left, through which issues an ichorous fluid, and it will remain for a long time, even as long as the horse lives, if it is not operated on. And the irritation is not confined to the cord alone, but extends up toward the inguinal canal; it

becomes very vascular, new growths are formed, etc. In such cases the animal suffers considerably, there is difficulty in progression, he falls off in condition, and sometimes there is a profuse discharge of pus, after which the animal seems relieved for some time; but irritation is again set up, and the same thing occurs. The remedy is to remove the diseased part of the cord, and the sooner the better. If the animal has suffered, perhaps, four or eight weeks, it is easily done. Open it up well and apply the clam as close to the inguinal ring as possible, and cut the diseased part off and secure the arteries by ligature, or by cautery—if by ligature, leave the ends of the ligature long, so that they can be taken out after a time; and you often have to secure several vessels, and I prefer a ligature. In some cases you might apply a clam and take it off by torsion, or use the clams and sear the small vessels and ligature the large ones; keep him quiet, feed moderately, etc. But sometimes it exists in the abdominal cavity, and then the operation is not likely to be successful.

Peritonitis is a result of castration, and is more apt to occur in colts. It may be due to the manner of the operation, or to a change of weather; but I think this is more likely to occur where the tunica vaginalis is irritated. I have seen it where there was a large amount of caustic, causing inflammation and peritonitis; or, it may be due to atmospheric influence; the symptoms are sometimes deceptive. It generally appears in about three or four days. In some cases the scrotum swells but very little, and there is no discharge of healthy pus, but there is a discharge of bloody fluid; the pulse is quick; the appetite gone; slight pains, not violent; he lies down, gets up and casts a peculiar, anxious look at the abdomen; gets up and stands around in a dull, languid manner; the breathing is affected; the pulse sixty or seventy, and weak. It has a great tendency to extend over the whole peritoneum. Give opium and digitalis, and counter-irritation, etc., and support the system as well as you can by stimulants, gruel, etc.

Tetanus usually appears about eight or nine days after the operation, just about the time it begins to heal; there may have been changes in the system before this, but the symptoms were not developed. It may follow any operation, and, as a general thing, the operator should not be blamed if the horse dies from some of these, but he generally is. Tetanus may supervene a very trivial injury; cold weather, cold drafts and exposure in any way tends to bring it on. There is an account given in our works of twenty-four horses that were castrated, and were given a cold bath four times a day after the operation, and sixteen out of the twenty-four died with tetanus; and I saw a case that I think was caused by the colt standing in a stream. Keep the animal quiet; apply fomentations, and endeavor to induce suppuration. Give hydrocyanic acid, belladonna, etc.; treat it just as a nervous fever; give a generous diet and bromide of potassium.

Amaurosis results, and is sometimes due to excessive hemorrhage; and if it is, the eyes will regain their natural condition as the system gains strength. But it sometimes occurs through a sympathetic nervous influence, and remains during life.

Glanders and Farcy.—When this does appear, I think the

infection had been in the system before the operation, and it is due to contagium in some form or other.

Operating upon Originals.—I cannot speak from experience. Prepare and secure the animal, and make an incision as in other animals; insert the fingers, and if the testicle is in the inguinal canal, get hold of it and draw it out. I would prefer an ecraseur for this. If it is in the abdominal cavity, it is more difficult, and to be successful, requires experience; and I do not recommend that all of you should perform this operation until you have seen it done, or have an animal under your own control, for some have tried it and failed.

THE TESTICLES.

Inflammation of the Testicles.—This is not common in the lower animals. The causes are injury of some kind or other—sometimes, in a stallion, from a kick, or exposure to cold. It is caused in a bull in the same manner, and occasionally from tubercular deposits, but usually from direct injury. The symptoms are generally plain, and your attention is usually directed to it. There is intense pain in the early stage; a slight injury to these organs sets up great pain; and when the whole organ is affected, the pain is intense, and they sometimes become enormously swollen in a very short time, and swelling generally affords some relief; he walks with great difficulty, and it increases the pain; he will sometimes lie down and attempt to roll, but generally continues standing; lying down increases the pain.

Treatment.—If in a valuable stallion, he is generally in high condition, in which case it is necessary to give a good dose of purgative medicine, or blood-letting may be necessary; take six, eight or ten quarts of blood; or, instead of this, give aconite; bathe at first with tepid water and increase the heat, and bathe for several hours and keep heat to the parts; you can do this by means of a bandage over the loins, kept in its place by means of a surcingle; keep cotton or cloths to the parts, and keep them supplied with warm water; give belladonna or laudanum. Local blood-letting is beneficial, but it is difficult to perform in the horse. During the early stage the appetite is entirely gone, and when he is relieved and the appetite returns, he should be fed sparingly. Give diuretics freely; sweet spirits of nitre, iodide of potash, etc., which increases the action of the kidneys, and stimulates the absorbents. If, after the irritation subsides, enlargement of the testicles remains, use iodine, both internally and externally, which, it is said, if used for some time, will reduce the size of the testicle. The treatment of the bulls is similar, but it is associated with tubercular disease. You may allay the irritation, but the animal will generally remain impotent.

Hydrocele Dropsy of the testicle and scrotum is most likely to take place from injury, when the inflammation is prolonged, but not very severe; for when any serious membrane is injured, there is more or less effusion; the scrotum is enlarged, and you can feel the testicle, which does not seem increased in size. The scrotum may be

distended by hydrocele, or hernia, and in geldings from an enlarged condition of the cord. If there is much fluid present, you must puncture with a small trochar—something like the one used in human practice. After this give iodide of potassium internally and use iodine externally. It is recommended to inject the tunica vaginalis with iodine, but there is danger of producing irritation.

Diseases of the Scrotum.—These can generally be traced to some diseased condition of the spermatic cord, the result of castration—as scirrhus cord, abscesses, fistula, etc. Scirrhus cord may come in two or three weeks after castration, or it may come years after the operation. Abscesses may be caused by a foreign body, or may be due to the scrotum closing up before the cord is completely healed; matter is formed at the cord, it becomes dry, sets up irritation and results in an abscess; and when due to this, it generally appears about three or four weeks after the operation. And it may be due to the incision not having been made large enough. So I again recommend a pretty large incision. It may come from a small piece of the iron remaining in the wound, if actual cautery was used. Or it may be due to a ligature setting up irritation, and the ligature should be left long, so it can be removed. Abscesses generally seriously interfere with the condition of the animal; he is gradually reduced in flesh; the swelling seems to involve other parts—sometimes it extends right down to the hock, and sometimes you may think there is not much matter, but it may be present and be two or three inches in to it. The best thing is to throw the animal and open it up pretty freely—you may have to cut in three or four inches. Then keep it open, foment the parts and feed the animal well. If you open them well and let the matter escape freely, it generally effects a cure; but they may form again and again. We are apt to treat them without opening them; but it is not the proper way. I believe horses are sometimes lost by this negligence and delay. After opening, inject well with tepid water, and even with carbolic acid, and if he is debilitated, give tonics.

Injuries to the Penis.—This occurs to both geldings and stallions. In the stallion it may be due to mal-address, causing irritation and inflammation; or being kicked when it is erected—this is very apt to be followed by inflammation—striking with whip, stick, etc., and is occasionally the result of exposure to cold. This sometimes occurs with geldings until they are unable to retract it into the sheath, and this is called

Paraphymosis, and it is sometimes due to the muscular tissue losing its power of contraction. This may be the case if a horse is put to too many mares. But I will speak of that caused by injury. If the penis protrudes for any length of time, the sheath restricts it, and sometimes becomes enormously distended, and ulceration is likely to follow if not relieved.

Treatment.—If it is of only one or two days' standing, try fomentations—warm water, in this case, perhaps, is preferable to cold, although cold causes contraction of muscular fibers. In this case it is so swollen that it could not be retracted, and the swelling must be reduced some before it can be retracted, and, in some cases, it is necessary to scarify it in two or three places, even, in some cases, before trying the warm water. When scarified it will bleed, and you should encourage the

bleeding. I have seen cases where it would be retracted from this treatment in five or six hours; but in some cases you may have to keep it up for twenty-four hours. It will generally retract when the swelling is reduced, unless there is great injury to the muscles; and after it enters into the sheath, try cold water, and I do not think it bad practice, in some cases, to put a stitch or two through the sheath to keep it in for an hour or two. In some cases it is necessary to give constitutional remedies, and in nearly all cases give diuretics, iodide of potassium and nitrate of potash. This may result from the debility caused by strangles, influenza, etc., and the treatment is similar. But it may lose the power of retraction in a stallion from too frequent coition; the muscles have been strained, and so lost the power of contraction. Such a case requires a great deal of time, and so long as he is in this condition he is useless; but he may completely recover after having been in this condition for a long time, even as long as twelve or eighteen months. If it is due to this cause he is apt to be in high condition, and it is necessary to reduce him some, but still feed him tolerably well; give nutritious food and some exercise; apply cold water to the penis and peroneal space, and use a suspensory bandage and keep it up, for hanging down tends to increase the irritation. Try the effects of iron and nux vomica, etc., to improve the condition. The penis is also sometimes the seat of

Warts and Growths, of various kinds, often prove troublesome and painful, especially when urinating. They are more common in the gelding than the stallion, and may result from the penis not being properly protruded when urinating. Sometimes they are of a malignant character, which generally ends fatally, sooner or later. Your attention is generally directed to it, but in examining for soundness it might be overlooked. If a horse is in health, and the sheath is well developed, there is not much the matter with the penis. But if he is debilitated and tucked up in the flanks, and has a small sheath, there may be trouble. There may be ulceration of the glans penis, from the causes I have mentioned. Get hold of the penis, have it nicely washed with soap and water, and touch the parts with nitrate of silver, carbolic acid, sulphate of copper, etc. In case of warts, remove them with the knife, and if you think there is danger of them growing again, touch with nitrate of silver, or the actual cautery, and keep the parts clean. Sometimes the penis is one solid growth of these, and, in most cases, it is necessary to throw the animal. I do not think it bad practice, if there is hemorrhage, to touch with the hot iron; and, if the horse is in poor condition, give tonics, good food, etc. Sometimes the glans penis is so swollen that the only chance of saving the animal's life is by amputating the penis, which looks like a very formidable operation—but it is not a very serious affair. First insert the catheter, and in cutting bring it to a point and secure the arteries; or you may, in some cases, arrest the hemorrhage by using cold water, and if you can keep the catheter in for a day or two, it is all the better, which will prevent cicatrization, for if it occurs, you will have ureamic poisoning and death—and this is the trouble I have had. But you can generally tell whether this is taking place. In about nine or ten days, just when you think it is about getting well, the urine is passed in a small stream; so if you can keep the catheter in, do so. Keep the sheath clean and allay the irritation by astringents. Some recommend taking the warts off by ligature, but it is not best.

URETHRA, ETC.

Stricture of the Urethra sometimes occurs. It is usually the result of inflammation, but may result from injury. It is, perhaps, oftener seen in cattle and sheep than in the horse, and may be associated with calculi. There is difficulty in urinating; the urine passes in a small stream. Inject with tepid water, with five or ten grains of sulphate of zinc to the ounce, and endeavor to relieve by passing the probang, if necessary; but this cannot be done in cattle.

Phymosis.—This results from inflammation, and is sometimes a sequel of castration, from swelling of the sheath; but so long as there are no great symptoms of fever it is not very serious. But if the pulse is quick and the appetite gone, it shows inflammation, and, perhaps, internal inflammation as well; or it may be the result of growth within the sheath. This is more likely to occur in geldings, because the penis is not protruded so freely as in the entire horse. Make a careful examination, and if it is the result of castration, scarifying and fomenting may relieve it; but if it is from growths remove them. Touch the parts with caustics—as sulphate of copper, carbolic acid, nitrate of silver, etc; and if the animal is in poor condition, build up the system, wash the parts carefully and use a little oil.

Ulceration of the Urethra is generally the result of injury, from being kicked, getting over a partition in the stall, etc. Endeavor to allay such an irritation as quickly as possible; but if ulceration has occurred, and a fistula is produced, then it is difficult to treat. Bring the divided edges together and, if it is of long standing, scarify, and then bring the edges together, and if you can keep a catheter in for some time, it is best to do so; and sometimes it is impossible to relieve it. The sheath, also, sometimes becomes dirty, and we have sometimes to attend to such cases. It may, if neglected, give rise to serious results; and there may be a kind of sabulous matter in the meatus urinarius, which, in some cases, may obstruct the passage of the urine. But if it is small, perhaps the size of your finger, it is not serious; but if it obstructs the passage of the urine, then just remove it and it affords relief; then wash with a solution of carbolic acid, chloride of lime, or sulphate of zinc.

Excoriation of the Penis.—This may occur in covering stallions, which may be due to the manner in which the penis is handled, or it may be due to the parts of the mare being small, or to serving a mare too soon after parturition—some discharge from the mare affecting it. Give a good dose of purgative medicine; lessen the diet; give diuretics, and bathe with cold water; and give some mild astringent, but be careful about using anything strong, or you may lose the service of the horse for a long time; but it is not generally necessary to lay him up more than two or three days.

Inflammation of the Urethra is also occasionally noticed, both in horses and bulls, but it is more common in dogs. There seems to be a kind of gonorrhœa in the dog, somewhat similar to that in man. Inflammation sometimes occurs in bulls, from jumping too violently upon a cow. It may be due to contagious influence in the dog, and there is said to be such a disease in the bull. In such cases act upon the system by laxatives, diuretics, etc., and use sulphate of

zinc. Powerful astringents may suddenly arrest the discharge, but this sometimes sets up constitutional fever, so I would recommend iodide of potassium, nitrate of potash, etc., followed by iodide of iron, which is excellent in the dog, and in any animal.

PARTURITION.

The Membranes that enclose the Fœtus before Birth.—The external is the chorion; the internal is the amnion, and between these two we have the alantois, which is a kind of serous membrane, and presents two portions—one in connection with the amnion, and the other with the chorion. It contains the amoniotic fluid. It serves to keep the fœtus warm, and to protect the fœtus and the mother; and in connection with the fœtus, at an early period, there is what is called the umbilical vessel, which, at birth, is hard to detect. Then we have the placenta, by which the blood vessels of the fœtus and those of the mother are brought into close contact; yet they do not anastamose, but the changes take place in the blood by osmotic influence. Then there is the umbilical cord, which is formed of the two umbilical or hypogastric arteries and the umbilical vein, covered by a gelatinous matter. Then there is the urachus, which is in connection with the bladder, and in after-life forms a ligament for the bladder. The placenta in the mare is attached by villi. In the cow it is attached by cotyledons, which are about sixty or seventy in number. The capillaries of the fœtus and uterus come in close contact, and so form these villi and cotyledons. They are little tufts attached to the uterus. The period of gestation varies in different animals. In the mare it is eleven months, in the cow nine months, in the ewe five months, in the bitch sixy-three days, in the sow one hundred and twenty to one hundred and forty days. But a mare may go even a month longer than the time; and a case is recorded where a filly had a foal at twenty-two months old, and heifers at fourteen months old; and a case is recorded of a mare having a foal at thirty years old. Mares moderately kept and worked will breed longer than one kept in the opposite manner. Difference of temperature is also supposed to have an influence. We are sometimes called to tell whether a mare or a cow is pregnant or not, and a correct opinion can sometimes be given, and in other cases a mistake is easily made. A mare generally becomes quieter in disposition, thrives better, and, after a certain period, the belly becomes distended, and some mares may go eight or nine months without showing this much. There are various ways recommended to determine this. The stethoscope is recommended, by which you can hear the fœtal heart beat; but you will be very liable to make a mistake in this way. Another is to insert the hand into the vagina and find out the condition of the os-uteri. But the best way is to examine *per rectum*, and in any case where it is necessary to give a definite opinion, examine in this way. As to the manner in which a mare should be used during pregnancy, there is difference of opinion. Keeping her in her natural condition is perhaps the best; but it is necessary sometimes to work her, and so long as worked moderately and not put to the wagon or cart, nor backed violently, there is no great danger. Such is the

case with farm mares, and parturition is easier with them than those kept in the stable. There are certain signs of immediate parturition; the sacro-sceatic ligament changes to a certain extent, and there is milk secreted; and when a wax appears on the teat, parturition generally occurs in two or three days, and often in twenty-four hours, and the water bag appears. The mare usually lies down, but the cow sometimes stands during parturition. It is sometimes best to be present to ligature the artery. Tie it about an inch from the umbilical opening, and cut off about an inch from the ligature. The natural presentation of the fœtus is the fore feet and head protruding; and when you are called and find the membranes protruding, examine the parts, if you can, before rupturing the membranes, and if all is right, delivery is generally easy; and do not use much force, but while the pains are present, use gentle force. But there are abnormal or unnatural presentations. Sometimes the abdomen of the fœtus is enlarged to an enormous extent, the result of dropsy. Although the head and feet protrude in a natural way, it is impossible for delivery to be accomplished without help. In such a case return the fœtus to a certain extent, and see if there are any abnormal conditions. If it is dropsy, let the water out, either with a long trochar and canula, or make an incision in the belly and let the fluid out. The fœtus is not generally alive in such cases; and if alive, there is no use keeping it alive; and you may meet a case of hydrocephalus, until the head is distended—until delivery is impossible. The feet and nose are perhaps protruding, and by inserting the hand you can feel the enlarged condition of the head; then let the water out. And there are other deformities, which, although the presentation be natural, will give you trouble; and when you see a proper presentation and no delivery, you may expect some difficulty, and hard work and perseverance are necessary. And do not be hasty in giving a case up, but make a careful examination, and find whether it is a fore leg or a hind one, which seems an easy thing, but when it is covered by the membranes it is not so very easy. We sometimes meet a case where the labor pains are present to a certain extent, without any signs of delivery. Make an examination, and if a mare is suffering from pains previous to her time, give one to one-and-a-half ounces of tincture of opium; or the powdered opium, one to one-and-a-half drachms. If the os-uteri is not dilated, use a little patience, and do not resort to force too soon, but dilate the os-uteri; and after you have properly dilated it, delivery will take place; but there are exceptional cases. If the pains have been present for some time, then dilate the os-uteri, and, in some cases, inject with tepid water; smear the parts with belladonna and oil, or soap and water; get one or two fingers in and work away, and dilation will gradually take place just by the force of the hand. If this fails, you will, in some cases, have to cut it, and this is attended with more success in the cow than in the mare; but, in some cases, it is the only chance. Make the incision in the upper part, but do not be in a hurry using the knife. We sometimes meet with cases where the hind feet are presented, but this is not a very difficult presentation. It is about second in the list, and it is rare that it is accomplished without some assistance. Possibly the body is turned on one side. The way to proceed is to examine closely, to see what you have to deal with, and turn it upon the belly, as nearly as possible, by making an assistant pull the feet while you get your hand in beside the body and turn it over, and delivery can be

accomplished. Another condition is having the hind feet presented and the fœtus upon its back, when delivery cannot be accomplished without assistance. Proceed to turn it upon the belly, if possible, by attaching a rope and manipulating, and the fewer instruments used the better; but you will often find benefit from the rope, and it is best to raise the hind parts a little, and while the rope is being pulled, endeavor to raise the buttock of the fœtus over the pelvic bones. Great damage is done by pulling upon the fœtus when in this position, and when you use force pull upward.

Breech Presentation Proper is where the buttocks and hind quarters are presented. It is very difficult, and if it is a powerful mare, and the pains have been present for an hour or two, and by putting the hand in you find the only thing protruding is the tail, then it is difficult, and, in some cases, it is impossible to deliver it without cutting, and the way to proceed is to endeavor to get hold of the hind legs, which is easier said than done. The crotch is useful to press the fœtus forward to some extent; at the same time endeavor to get the hind legs. Get a rope under the stifle and pull back some, and if you can get the rope down to the fetlock and get one leg, you will generally be able to get the other. Use force while the mare is straining. You may not be able to get the feet into position, when the only chances are to cut the limbs off at the hock—that is, where the hocks are protruding—and the best instrument is the chain saw, which I would recommend you to have. Having removed the hock, put the fœtus forward, when you will be able to get the limbs. Another method is embryotomy, or cutting away the fœtus. Another way is to make an incision just below the tail and remove the contents of the abdomen, and by diminishing the size of the bowels you may be able to deliver it. A hook is of use in this operation. If you fail in this, then cut through to the brim of the pelvis and take off one hind leg. This requires perseverence and hard work. Another false presentation is where the fore legs protrude, and the head is turned back over the shoulder. In such a case improperly applied force is of great danger. In such a case, apply a cord around the fetlock and push the fœtus back into the cavity and get hold of the head, and you may be able to get a cord around the under jaw; then push it back with the crotch and straighten it out, and you will be able to deliver it. One of the limbs may protrude and the other be back with the head, or the head thrown down between the fore limbs. In such cases, no amount of force will be able to deliver it. Where the head is thrown down it is a pretty difficult case. Push it back and endeavor to get hold of and straighten the head, and delivery will be easy. Another presentation is the head protruding without the feet. In such a case the fœtus soon suffocates if relief is not afforded. Push it back into the cavity and get hold of the limbs, and then deliver it. But if it is two or three hours after the fœtus has protruded, and it is dead and the head swollen, then disarticulate the head and attach a cord around the cervical vertebra, then push it back and get hold of the fore feet and take it away; but do not be in too much of a hurry in giving up a case, and use your head as well as your hands. As to medicines, there is benefit in opium, chloroform, etc., and it is best sometimes to put the animal under the influence of chloroform. Change the position of the animal, elevate the hind quarters, etc. Sometimes we meet a case where the side of the neck is presented and the feet turned upward. The best way is to turn it and bring it into its natural po-

sition; endeavor to get a rope around under the head and a portion of the limb; get an assistant to pull, and get your hand in; manipulate and you can generally turn it, but not always, and it is sometimes necessary to perform embryotomy. Endeavor to sever the attachment of the fore extremity from the trunk; draw the leg out and make an incision as high up as possible, and run the knife up the inside of the leg to the shoulder, but do not cut the leg off about the knee, for it makes the case worse. In some exceptional cases you may have to cut off the other leg. Another is a back presentation. It is very difficult. When you examine perhaps you will find the loins or dorsal vertebræ presented, and if the hind quarters are nearer than the fore, endeavor to make it a breech presentation; but if the fore quarters are nearer, try to make it a natural presentation. You may be able to turn it with the crotch, but if you can not change it, then perform embryotomy. Cut through the vertebral column the best you can and use the chain saw; get into the thoracic cavity and get the contents of the abdomen out, but it is a very difficult case. Another condition is where the whole four legs, or perhaps three of them, or a fore and a hind one are presented. It can not be delivered in this way, and you must endeavor to make it a natural or breech presentation. If you endeavor to make it a breech presentation, get a rope around the hind leg; if you intend to make a natural presentation, get the rope on the fore leg. Then use the crotch, and turn it. In the case of twins you may meet with difficult presentations, but when there are twins they are not usually so large as where there is but one. You may meet with breech presentation where the hind limbs of both are presented, or the fore limbs of both. I saw a case where they were coming belly to belly. The remedy in such a case is to push one back into the cavity and effect a delivery of the other. And you may meet with many presentations different from the ones I have mentioned. The first thing is to make an examination; the second, to use force if necessary; and the third is, to persevere in it. Sometimes the fœtus dies, and the liquids in connection with it escape, and the parts become dry, and delivery is assisted by injecting with tepid water. Some recommend oil; I prefer tepid water. And sometimes decomposition sets in, and the fœtus and the vagina of the mare swell greatly; perhaps the mare can not get up; the pulse is almost imperceptible, and it is best to destroy the animal. This seldom occurs, only after a great deal of force has been used. Sometimes you will meet a case where the fœtus is carried for a long time over the time, and it is said that the mother, in such a case, may conceive again; but if the fœtus carried is in the uterus, and not in the tubes or in the abdomen, conception can not take place. I saw a case of a cow that seemed to be pregnant for seven or eight months. About the eighth or ninth she decreased in size, and about four months after the usual time of calving I examined and found the uterus but slightly enlarged. I dilated it with my hand without any great amount of force. But, in such cases, I believe there is a certain union between the fœtus and the uterus, which has to be broken down. In this case I worked five or six hours, until I was tired out, and thought better to desist for the time, and make another attempt; and in five or six days I returned and worked five or six hours, using the hand and a knife carefully, and again left it, and again returned and removed it entirely, and the cow recovered completely, but I do not know that she was ever again in calf. A cow

will stand a great amount of cutting and carving, if you do not injure the uterus. In such cases your arm will suffer considerably from the acrid properties of the fluid, not that it is of a poisonous character, but eruptions may come on the arm and be painful; and sometimes we hear of a practitioner dying from the effects of it; but I do not think it is caused by any poison, but from the irritation set up; erysipelatous or phlegmonous inflammation is set up, although it has been said that it was due to the poison of the decomposing matter. A mare should be carefully used after difficult parturition; keep her nice and warm, and bathe nicely with warm water, to allay the swelling. I believe some cases are lost by carelessness after parturition, as by allowing the animal to lie on the cold ground, which sets up inflammation of the womb. But keep warm, give an opiate, sweet spirits of nitre or alcoholic stimulants, and if there is no irritation after a day or two there is no great danger. Sometimes the entire membranes are retained after parturition, and it is called retention of the placenta; more properly, perhaps, retention of the fœtal membranes. It is more common in the cow, and also in the sheep, than in the mare. There is a difference of opinion as to what should be done in such cases. I think it is best not to be in too much of a hurry in removing it in such cases by force, especially in the mare. In most cases it comes away in from five to fifteen minutes up to eight or ten hours. There are certain remedies recommended, as savin, laurel, bi-sulphite of soda, etc. I do not think powerful remedies are called for, but in the cow regulate the diet and give from two to eight ounces of epsom salts, with some gentian and ginger, perhaps, given in two doses; keep her warm, give nice food, and the after-birth will, in most cases, come away. But if this fails you must remove it, and do not allow it to remain too long. But so long as it does not decompose to any great extent, there is no great danger; but when it does decompose, it may give rise to septicæmia. It is generally easily taken away. Just get hold of the membranes with one hand, then insert the other hand into the uterus and break down any adhesions with your fingers. In the mare it is removed in the same way. After removing it, supposing it had remained in for eight or ten days, inject the uterus with tepid water, and after this with a weak solution of carbolic acid, feed well and keep her comfortable. There is a more serious result than this, which is inversion of the uterus. This is very serious, and not uncommon, and is more frequent in cows than in mares, and the treatment is more successful in cows. It is most likely to occur in weak and debilitated animals. In those fed upon poor food the ligaments of the uterus become more than naturally relaxed. In the mare it is similar, and is a very serious condition, and is seldom treated with success. If it is only partially inverted, it is not so serious; but if it is complete, you can notice the uterus protruding, which is a large, reddened, swollen mass, and the fœtal membrane may be attached to it. If it is complete in the cow she does not stand long, owing to the weight, and when she does lie down she may not be able to get up. The uterus becomes dirty and exposed to the cold. The proper thing is to cleanse and return it, which is difficult, but it can be done. If the fœtal membranes are attached, remove them carefully; bathe the parts nicely, and it is recommended to scarify, but you must be exceedingly careful about scarifying. As well as tepid water, bathe with laudanum and water (but before bathing it is necessary to put a large cloth, as a table-cloth, under the parts); then endeavor to return it,

which is easier done when the cow is on her feet; so if you can, get her on her feet, and if you can not do this, turn her upon her back. There is difference of opinion whether to begin at the fundas or neck to return it, but if you can not do it one way try the other. Then there is another difficulty, and that is to get it in position after it is returned; but endeavor to carefully unfold it, and then give opiates, or stimulants—some recommend one, some the other. And it is necessary to keep it in by some means—elevating the hind quarters is of benefit, and there are various pessaries recommended. A good one can be formed by covering a piece of wood with cloth or chamoise skin, pass this in and secure it in some way; a bottle has been recommended, but it may get broken, and a piece of wood the shape of a beetle makes a good one. Secure and keep it in by ropes or straps. Another way is to put three or four stitches through the vulva – the animal can urinate through the lower opening. And there are various trusses which are of benefit in some cases, but I think the pessary the most successful. It is a good plan to press upon and get the back to bend down. Some recommend, and I have tried, inserting a big pin through the skin on the back, and put twine around it, which causes the back to bend. This is similar and more troublesome, but not so common, in the mare. You may meet a case where the uterus is gangrenous. Then do not return it, but you may endeavor to save the life of the animal by removing it, which is sometimes successful. And in some cases it is best to place the animal under chloroform, then tie a cord around it as close to the os-uteri as possible, then cut the parts off and arrest the hemorrhage. Some recommend using the ecraseur, taking one-half, one-third, etc., at a time; then keep her quiet. If she is weak, as she is apt to be, give stimulants, but I do do not know whether it is necessary to operate in a mare. I never knew a mare to recover. Another condition is prolapsus, or inversion of the vagina, both before and after parturition, and is more common in cows than in mares. Poor keeping is a common cause; another cause is an impacted state of the rectum; or standing in a stall higher in front than behind. By examining you can tell the difference between this and inversion of the uterus, and sometimes the uterus protrudes at the same time. If due to a compacted state of the rectum, clear out the rectum, and it is generally easily returned. Remove the cause, elevate the hind parts, and you can use a truss of some kind; and if the animal is in poor condition, give a generous diet, tone up the system, etc. The treatment after parturition is just the same as before parturition, and it may protrude for some time before parturition without doing much harm. In some cases it may be advisable to put a suture through the lips. Astringents, ascetate of lead and water, have been recommended. After cleansing use cold instead of warm water, which tends to contraction. But if there is irritation I prefer warm applications. If the uterus is lacerated, stitch it up, and then endeavor to return it. It is recorded that some have recovered. I never saw a case recover.

DISEASES AFTER PARTURITION,

Milk, or Parturient, Fever, which differs from parturient apoplexy. Any case of parturition produces more or less fever, the

pulse is slightly quickened, the temperature elevated, etc. Parturient fever usually accompanies the secretion of the milk. There is a great amount of blood in the system which goes to the milk, and milk fever is an invariable sign of a good milker.

Symptoms.—The pulse increases some; the udder becomes tender and slightly swollen, the swelling extending along the belly, and sometimes between the fore legs—and even in some cases before parturition; the breathing is slightly quickened; the mouth hot; and when the milk is properly secreted there is no danger to be apprehended. Although it is simple, we are sometimes called to treat it, and sometimes the symptoms are premonitory symptoms of parturient apoplexy. It exists more in well-bred animals than in others.

Treatment—Regulate the diet; give good food; give about eight ounces of epsom salts and an ounce of saltpeter, dissolved in a quart of water, and follow it by a few doses of diuretic medicine. If the udder is swollen and hard, foment and hand-rub it, and, in some cases, use some simple ointment, as calamine ointment; stimulants are generally unnecessary. If it continues too long, give a few doses of the iodide of potassium. It is a simple febrile affection. Give but little food for twenty-four or thirty hours.

Purpural Fever, of which there may be different kinds—as parturient peritonitis, in which the peritoneum and uterus are inflamed, and, perhaps, the large nerves of the parts involved. Another serious condition is that in which the brain is the principal seat of the disease, but the spinal cord is involved. This is called parturient apoplexy. There is another form in which the spine is the principal seat of the disease, and the large nerves going from the spine to the posterior extremity of the body are affected, causing loss of power, and in post mortems there is sometimes effusion into the peritoneal cavity. I will first speak of

Parturient Peritonitis, but the inflammation is not generally confined to the peritoneum alone, but it also affects the uterus, and we have a low fever, and in post mortems we find diffuse inflammation of the peritoneum, and more or less in the uterus. The vessels going to and coming from the uterus are affected, and the nerves are thickened to a certain extent. It may occur at any age and follow any case of parturition, but it is generally the result of bad usage, either before or after parturition. Animals exposed to the cold, or having been driven, are more liable to it.

Symptoms.—It usually shows itself the second, third or fourth day after calving. The supply of milk is impaired more or less; the urine is coffee-colored, and it usually attains its intensity in from six to ten hours. The symptoms are somewhat like parturient apoplexy; she paddles with the feet when walking; looks at the sides; lies down, and, in some cases, is not able to get up—(when a cow becomes affected by urinary or abdominal diseases she is generally very helpless)—she will moan, stretch out the neck, lift the head and look at the flanks; respiration increases; the mouth, muzzle and horns hot, and the temperature of the body is increased; constipation is present, and if any feces are passed they will be hard and covered with mucous; and there may be a discharge of a brownish colored fluid from the vulva; power is lost and you are apt to think it is apoplexy. But there are no cerebral symptoms developed, and there is more pain present. It is a very fatal complaint.

Treatment.—Give sedatives and opiates. At one time purgatives were recommended, but I do not use them as freely as I used to do, and do not recommend giving large doses of purgative medicine. But it is good to give a slight laxative, and opiates do not act so well in cattle, but give opium and belladonna. Some recommend blood-letting in the early stages; but if the cow is down, and effusion has taken place, blood-letting should not be practiced. Attend to the care of the animal, and get her well on the breast, and if the bowels are costive give injections, and if feces are passed freely it seems to give relief. Draw the urine with the catheter if it does not come away. Use counter-irritation, which must be stronger for cattle than horses, and sometimes use a little croton oil. Sometimes this prevails as an enzootic disease, due to the manner in which they are kept and the weather.

Parturient Apoplexy.—This disease principally affects the brain and spinal cord, due, in most cases, to a congested state of the brain, in which it differs from parturient peritonitis, and, in some cases, it involves the sympathetic system, which has a great deal to do with certain diseases, and it may be influenced in various ways. There are various theories brought forward in regard to it. It was thought to be due to a specific poison in the blood, which would produce the disease in other animals; it is also said to be due to the arteries of the brain in cattle differing from those of the horse. But these are not tenable. Another is that the sympathetic system has something to do with it. This is tenable. When a cow is in good health and the secretions going on in a natural manner, parturition is easily accomplished, and there is a large amount of blood in the system which is to go to the milk, and, instead of going there, it is thrown back upon the system, to a certain extent, influencing the sympathetic system. It is due, generally, to a plethoric condition—those affected are those in perfect health. Prof. Williams' theory is a good one (Williams' Veterinary Medicine, page 462). Post mortems usually reveal lesions of the brain and spinal cord. There is, even, effusion into the ventricle sometimes, and the spinal cord is sometimes reddened. There are other conditions, but they are generally incident to the condition of the animal before death. There may be hypostatic congestion of the lungs or liver. The most noticable characteristic is the rapidity of its development. An animal may appear in perfect health, and be dead in four or five hours. It appears from the first to the third day after calving, and the sooner it appears the more fatal it is. Another peculiarity is, it seldom or never follows an abortion, while parturient peritonitis does; and it does not occur in very young cows, but is most likely to attack a cow in her prime. It follows difficult parturition, when force has been used, or where there was hemorrhage from the womb, and seldom occurs in an animal in poor condition.

Symptoms.—Perhaps the first noticed is, the cow does not give as much milk as she should; the urine depressed and the bowels constipated; fever takes place, and all the secretions are affected, and perhaps there are no other symptoms, and if you are called to a case in which there is not the milk expected, and the above symptoms, then look out for it, and give something to prevent it. There may be but little pain, and the thermometer will reveal a slight increase in temperature. When the well-marked symptoms appear the cow moves first one and then the other leg, paddles, as it is called, when she walks,

lies down, gets up and again lies down, until, perhaps, she can not get up; then, perhaps, dashes the head violently, throwing it up over the shoulder, which seems to be a favorite position; then she may, perhaps, become comatose, the pupil dilated, and the breathing stentorious; the pulse forty, fifty or sixty, and almost imperceptible; there is but little feeling, and death soon occurs. In other cases the symptoms are not so rapidly developed, and such are more easily treated. It is generally easily diagnosed, but you may make a mistake in the early stage of the disease.

Treatment.—There are many remedies recommended, and, I think, in the early stage, before the animal gets down, that abstraction of blood is beneficial; but there is difference of opinion here, therefore I recommend taking blood, and, as well as that, give a pretty good dose of purgative medicine—from one to two pounds of epsom salts—and give injections; but if partially or completely comatose, do not take blood, but give stimulants—as sweet spirits of nitre, nitrate of potash, etc., and a dose of purgative medicine; give injections; draw the urine; turn her from one side to the other; bed well and make her as comfortable as possible, and if comatose, put cold water or pounded ice to the head. Treat the same as sun stroke. A case may recover after being comatose for five or six hours. While comatose you must be careful in giving medicine, for it may pass into the trachea and cause suffocation. In such cases, try the stomach pump, or the small tube, and get stimulants into the stomach, or use hypodermic injections of ether, etc. In the early stages give bromide of potassium in pretty large doses; keep cold to the head, and inject freely with soap and water; keep her clothed, and attend to the general comfort of the patient. If the animal shows signs of recovery in about twenty-four hours, feed sparingly, and give nux vomica if the nervous system is affected. It is easier prevented than cured, and if a cow is so affected and cured, she is more liable to be affected again, and if in any cow you suspect it, restrict the food before parturition and give one-half or one pound of epsom salts, and give diuretics or hypo-sulphite of soda. This sometimes occurs before parturition, but not often, and is easily prevented. Do not give much food for some time after parturition; do not even allow her upon luxuriant pasture, but turn upon a poor pasture. Croton oil, calomel, etc., have been recommended, but I do not think they should be used.

Parturient Paralysis makes its appearance about the third or fourth day after calving, and it is not so serious as apoplexy. The spine is sometimes affected, and sometimes just the large nerves. Loss of power is the principal symptom. There is paddling action; the animal falls or lies down and can not get up; perhaps the secretion of the milk is impaired; if you prick her with a pin there will be sensation but no motion. Regulate the diet; give a laxative; stimulate the loins with the ammoniacal liniment, mustard, etc. An old and perhaps a good way is to cover the loins with a blanket, and take a warm smoothing iron and rub over the outside. If it continues too long, use the galvanic battery, and, in some cases, after five or six days the animal will get up as well as ever. Or she may knuckle at the fetlocks for some time; then try strychnine, and apply a strychnine liniment to the loins—but not too much at a time, or you may cause poisoning.

Mammitis, Inflammation of the Udder, Garget, etc., is inflammation of the mammary glands, which may occur with other diseases, as from inflammation of the womb, irritation of the stomach. It occurs usually in the milch cow, but it may occur in the heifer. It occurs in two forms, which differ some from each other, but I do not know that the treatment differs much. In one form the skin and membranes under the skin are affected; in the other, the glandular substance is affected. It may be circumscribed, or it may extend and involve the deep-seated structures.

Symptoms.—The udder is hard, hot and tender, and is accompanied by constitutional fever, which is, in many cases, ushered in by shivers; the animal begins to breathe rapidly, and you might think it was some disease of the respiratory organs; the pulse is quickened; the appetite more or less impaired, and cessation of rumination; the bowels may be constipated, or there may be diarrhea, but the febrile state of the system is apt to produce constipation. But some irritant may be present, and may have had something to do in causing the disease. When this disease involves the deep-seated structures, suppuration and a scirrhus condition are produced, which destroy the secretion of the milk.

Causes.—Irregular milking is a common cause, which irritates the glands and causes inflammation. It is also produced by changes of temperature, exposure to cold, etc., and sometimes results from parturient apoplexy, due to the manner in which she lies, pressing upon the udder, etc.; or it is due to the sudden changes in temperature, as the hot days and cool nights of September; standing in wet, dirty stables; exposure to wet, etc. Inflammation of the glandular substance may terminate in resolution, but it is likely to terminate in ulceration and destruction of the gland; but if it is circumscribed and is opened in time, it may impair it but little. A common termination is fibrous degeneration or scirrhus condition.

Treatment.—If in the early stage, give two or three ounces of nitrous ether, with one to one and a half ounces of nitrate of potash, followed by aconite. Use warm fomentations and keep them up for some time, then dry well and use the camphorated liniment; or you may put a bandage to the parts, having holes for the teats; pad it with wool, cotton, etc., and pour in warm water. A hot poultice is an old and very good remedy, but in cold weather poultices, etc., are not best, but apply liniments, and wool, tow, etc., warmed at the stove and applied to keep heat in the parts, should be used. Some use cold water, but I think warm is preferable—better to relieve pain—and if the pain is very great, use anodynes, as belladonna, laudanum, arnica, etc. If it has terminated in suppuration it is best to let it out through the teat by means of an ordinary concealed bistouri, by pushing it up the teat. But if it is circumscribed and points, open at the prominent part. Sometimes a part becomes scirrhus or gangrenous, and it may be necessary to remove a part of it. Have the animal well kept; give tonics if the animal is weak. It is necessary to milk the cow occasionally, which adds to the irritation, but you may overcome this by means of a teat siphon, allowing the milk to drain off. If there is a slight induration, without much change, then use iodine ointment, and possibly iodide of potassium internally.

AZOTURIA, ETC.

Azoturia, Partial Paralysis, is a dietetic disease, a hyper-nitrogenous condition of the blood, and of the system generally. There is partial or complete loss of power of the hind limbs, although the nerves are not altogether affected; but it is due to tonic spasms of the muscles of the loins and the tissues in connection, and affects the kidneys more or less. It was called hysteria, and was supposed to be peculiar to mares only. Another term is enzootic hæmaturia; another is hæmogloburia. It attacks a horse that has been working, then stood in the stable and fed well upon nutritive food, which produces a large amount of albumen in the blood in particular, and in the system in general; and then the horse is taken out and exercised. The result is an increased oxidation of the albumen, and it is changed into various compounds, causing an excess of urea and hippuric acid, producing spasms and contractions, especially of the large muscles and tissues of the loins, producing loss of motor power. And when it attacks the psoas muscles it is more severe than when it attacks the gluteal muscles. This condition extends farther than the muscles, in some cases, and in some cases even the covering of the spinal cord may be affected, the sheaths of the nerves and the kidneys also, arresting the secretion of the kidneys in the early stage. The faster the work the more serious will be the attack. It is more common in the winter months, as the animal is kept in the stable, well fed, for a time, then taken out and worked.

Symptoms.—Suppose a case: A horse is taken from the stable and trotted out from a half mile to three or four miles; he becomes sluggish, perspires more freely than he should; then well-marked stiffness appears in connection with the muscles of the loins. If stopped, the breathing is noticed to be increased, the pulse quick and weak, and the loins, in many cases, are hard and tense; the bowels, in some cases, are tympanitic. In aggravated cases the symptoms become more severe; he drops on the hind quarters, staggers, and perhaps falls; he may lie down, get up and lie down, etc., until he is not able to get up longer; or he may suddenly falter during a drive, as if he had picked up a nail. But if the above symptoms are also present, and you are informed that the horse was standing in the stable for some time, it is likely to be azoturia. The ears and legs cold, pain in the parts, and colicky pains. But in some cases the symptoms are not so well developed, but if allowed to stand fifteen or twenty minutes it will show itself by stiffness. The urine is of a dark red color, and contains an excess of urea, and, in some cases, albumen. If the urine is allowed to stand, a sediment is thrown down, and nitric acid will precipitate nitrate of urea. Azoturia is often mistaken for inflammation of the kidneys. Post mortems reveal the muscles affected—soft and flabby, of a darkish red color—the kidneys slightly congested; there is dark urine in the bladder, and hypostatic congestion, which is, perhaps, due to the position the animal has occupied. If the animal is properly treated in time the symptoms will disappear in from four to ten hours, and in two or three days the animal will be well. Your prognosis will be based upon the severity of the symptoms. If the animal is unable to rise, there is great pain, the pulse quick and full, it is unfavorable. I believe it is sometimes combined with irritation of the bowels; but although the patient is down, and the pulse is not full and bounding, but just quickened some, and no great pain, the prognosis is favorable.

Treatment.—In an ordinary case I recommend a slight stimulant; give sweet spirits of nitre; cover the body well and induce copious perspiration, and give a good dose of purgative—from six to twelve drachms of aloes—and give injections; apply counter-irritation to the loins. Some object to this, but I think hot water is beneficial. Immerse a blanket in hot water, and place it over the loins and cover it with dry blankets. Or, if you can not apply this, take a liniment and rub in as a shampoo over the loins; or mustard may be used, but do not use anything that will blemish; and, if necessary, draw off the urine, which is often retained in the bladder. After treatment, carefully use sedatives—aconite and carbonate of soda. There is great thirst and the animal should have plenty of water, in small amounts at a time, with, perhaps, just the chill taken off, and keep the animal as comfortable as possible, and turn him from side to side, as necessary, and, when there are signs of amendment, try to get him upon his feet, even if he only stands fifteen or twenty minutes. It is best to take the shoes off if the animal is kicking around much; and, in some cases, you may use slings. It is a disease that is generally satisfactory to treat. If a horse was stopped and not driven any further, when the symptoms are present, it would not generally become serious; but I do not know whether the horse, after recovering, is more liable to another attack or not; but when recovering, and the appetite is good, if he is allowed to eat too much, it is more apt to return. Nitrate of potash is another remedy, but I prefer one to one and a half ounces of carbonate of soda each day for several days. Blood-letting is recommended, and, if taken in the early stages, it is, possibly, beneficial. Sedatives are not demanded if the pulse is weak, and ammoniacal stimulants are not generally advisable. Do not push opium too far, but if there is much pain give belladonna or hypodermic injections of morphia, and, unless the animal is suffering great pain, do not give opiates. I saw a case combined with spasms of the diaphragm. This proves serious. Give anti-spasmodics; the other treatment is the same. When he lies down the spasms are increased, and respiration is more difficult, and death may result from asphyxia.

Metritis, Inflammation of the Uterus.—In the mare this is inflammation of the substance of the womb—it is endo-metritus when confined to the lining membrane. It is usually a sequel of parturition when prolonged, and where force has been used. But there are other causes—as exposure after foaling, lying on damp ground, etc., and these are common causes of it when it is not due to parturition.

Symptoms.—It usually occurs in three or four days after parturition. There is uneasiness and pain; the back is arched—straining—and, in some cases, there is a dark red fluid passes from the vagina. In some cases she will lie down, moan, and occasionally cast anxious looks to the abdomen; the pulse quick and wiry, the mouth hot, the ears cold or alternately cold and hot; cold sweats, perhaps, appear behind the shoulders and in the flanks, and the vulva may be swollen; the urine is passed often and in small quantities, and the symptoms may be more aggravated and the animal may die in two or three days. This disease may extend and involve the peritoneum, but not so apt to do this as in cows.

Treatment.—Allay the action of the heart by Fleming's tincture of

aconite, ten to fifteen drops; combat the pain by opium or hypodermic injections of morphia, and keep her comfortable; if cold, rub well and clothe nicely; counter-irritation to the loins is recommended—as mustard, hot cloths, or a newly-flayed sheep skin; but do not keep the sheep skin on too long, perhaps twenty-four hours will do, and keep the parts warm after taking it off—and give injections. It is also recommended to inject the uterus, and you may put laudanum in the water. Give a purgative—ten to twelve ounces of oil, which is preferable to aloes. Treat it about the same as inflammation of the bowels. Keep her extremely warm. If there is a discharge from the vagina, inject first with tepid water, then with a solution of sulphate of zinc, or carbolic acid, one part to forty or fifty of water.

Leuchorrhœa, or Whites.—This is met with in old and debilitated mares, especially after they cease to breed. There is a white, glairy discharge from the uterus, which looks like curdled milk. It sometimes accumulates in the uterus and then comes away in large quantities and there is a fœtid smell; the animal gradually becomes debilitated. Disease of the ovaries may produce it, but it is most likely to occur from debility. It is common in well-bred cattle, and may be associated with tubercular disease in cattle.

Treatment.—Use both local and constitutional treatment. First inject the uterus with warm water and then with cold water—and one of the best preparations is carbolic acid, about one to forty, which may, in some cases, be increased. I have used it as strong as one to sixteen, but do not keep up the use of this strong lotion, but after one injection use the weak solution; give general tonics—iodide of potassium, iodide of iron, etc. Percival recommends acetate of lead, 1 drachm; opium, one scruple; turpentine, two ounces. But the best, perhaps, is iodide of iron, iodide of potassium, etc. In cattle, it is similar, but if it is associated with tubercular disease, the animal will be unfit for breeding purposes.

Barrenness may be due to contraction of the os-uteri. Apply belladonna, and dilate it by means of the fingers and catheters.

DISEASES OF THE OVARIES.

Enlargements—Ovarian Tumors are generally of an encysted character. They are more likely to occur in mares that have had several colts, but they may come in any, from faulty conformation. The

Symptoms are not very plain. It may exist to a great extent without extending the abdomen. The mare is supposed to have slight attacks of colic, but the symptoms differ some from colic. The pain continues perhaps a half hour or an hour, the pulse is not materially affected, and the symptoms gradually disappear; the mare is usually irritable, falls off in condition, and may have a tucked up appearance; the tumor may pass around some of the intestines and cause strangulation—causing the ordinary symptoms of strangulation. If there is slight irritation in connection with the generative organs, and these symptoms are present, make an examination *per rectum*, and

if it is of any great size you can detect it. There may be a slight discharge from the vagina. There can not be much done by way of treatment in the mare. I would recommend iodine, iodide of potassium, etc., and you may deem it worthy trying an operation, but it is not generally successful.

Vaginitis is generally the result of difficult parturition. Give a laxative and iodide of potassium, and you may use some slight astringent. Allay the irritation.

Abscess on the Vulva, caused by some irritation. Open up and let the matter out. If she is in good condition, give a laxative; if in poor condition, give nutritious food.

Partial Closure of the Lips of the Vulva may occur in the cow after difficult parturition. The lips may grow up until you could scarcely introduce the ordinary director. It is best treated by opening up, and, if seen in the early stage, you can do this with the fingers; then use a pledget of tow to keep the lips from uniting. Allay the irritation; apply lotions, etc.

Ovariotomy.—This, like everything else, requires practice. It is frequently performed in pigs, by cutting into the flank on either side, remove the ovaries, secure the vessels and treat as a wound. It is best to get a dead animal and examine as to the position of the ovaries, etc., before operating on a living animal. Cattle are sometimes operated on. They take on flesh more rapidly after the operation. It has been, and is still, recommended to splay milk cows four or five months after calving, and it is said that they will give milk for four or five years and take less food. It was advocated in Scotland some twenty-five years ago, but I think it proved a failure. But lately it has been practiced and recommended, especially in the Southern part of the United States. One way of operating is to cut into either side, the same as in the pig. Another is to cut into the abdomen. The way it is now performed is to pass the hand into the vagina, dilating it carefully (but it can not be performed until the animal is from six to twelve months old), make your incision through the walls of the vagina about one and a half or two inches from the os-uteri, get the fingers through and get hold of the ligament of the ovaries and pull them down and remove them. The ecraseur is, perhaps, the best mode of removing them. First examine a dead animal, and operate for experiment. The ovaries were removed from a mare by one of our students and she lived for several days, and was getting along nicely, when she was taken to the dissecting room.

Perpetual Bulling is due to an abnormal condition of the ovaries, and, in well bred cattle, to tubercular disturbance. The best treatment, perhaps, is ovariotomy. It sometimes occurs in the mare. A good sedative, in some cases, may allay the irritation.

The Clitoris may be enlarged or lacerated, due to irritation of some kind or other. Use local and constitutional remedies; touch with nitrate of silver, carbolic acid, etc. If there is an enlargement remove it.

Melanotic Tumors may be present, especially in a white mare. They are a kind of black tumor, and may be in other parts also.

DOSE TABLE.

Giving a List of Medicines, with Doses for Different Animals.

		Horses.	Cattle.	Sheep.	Hogs.	Dogs.
Aconite, root	U. S. P. Tincture	10 to 30 m.	10 to 30 m.	2 to 3 m.		1 to 2 m.
" "	B. P. "	½ to 1 f. dr.	1 f. dr.	6 to 10 m.		4 to 6 m.
" "	Flemming's Tincture	10 m.	10 to 20 m.	2 to 3 m.		1 to 2 m.
Alcohol		1 f. oz	1 to 3 f. oz.	½ f. oz.	2 f. dr.	1 f. dr.
Aloes	Barbadoes	2 to 10 dr.	1 to 2 oz.	½ to 1 oz.	2 to 5 dr.	½ to 1½ dr.
Alum		2 to 4 dr.	2 to 4 dr.	½ to 2 dr.	½ to 2 dr.	10 to 20 gr.
Ammonia	Strong	2 to 6 f. dr.	2 to 10 f. dr.	1 f. dr.	1 f. dr	5 to 12 m.
"	Carbonate	2 to 4 dr.	3 to 6 dr.	15 to 60 gr.	15 to 60 gr.	3 to 8 gr.
"	Liquor Acetatis	2 to 4 f. oz.	2 to 4 f. oz.			
Anise	Seed	1 oz	1 to 2 oz.	2 to 3 dr.	2 to 3 dr	20 to 55 gr.
Antimony	Sulphuratum	1 to 3 dr.				
"	Tartrate	1 to 4 dr.				
Areca, nut		4 to 6 dr.				¼ to 2 dr.
Arnica	Tincture	4 f. dr.	8 f. dr.			6 to 8 m.
Asafœtida		2 to 4 dr.	2 oz.	1 dr.		10 to 20 gr.
Arsenic		5 to 10 gr.	5 to 10 gr	1 to 2 gr.		1/10 to ⅓ gr.
Atropine		½ to 1 gr.	½ to 1 gr.	1/10 gr.		1/30 to 1/20 gr.
Belladonna	Leaves, dried	2 oz	2 oz			5 to 10 gr.
"	Extract	1 to 2 dr.	2 to 3 dr	20 to 30 gr.		2 to 5 gr.

		Horses.	Cattle.	Sheep.	Hogs.	Dogs.
Buckthorn	Syrup					1 to 2 oz.
Calabar, bean	Powdered	5 to 8 gr.	5 to 8 gr.			1 to 2 gr.
" "	Alkaloid	1/8 gr.	1/8 gr.			1/20 gr.
Camphor	Gum	1 to 2 dr.	2 to 4 dr.	20 to 40 gr.	20 to 40 gr.	5 to 10 gr.
Cantharides	Powdered	4 to 20 gr.	10 to 20 gr.	2 to 8 gr.	2 to 8 gr.	1/2 to 2 gr.
Carbolic acid	Melted Crystals	15 to 40 m.	15 to 40 m.	5 to 8 m.	5 to 8 m.	1 to 2 m.
Cascarilla bark	Powdered	2 to 4 dr.	1 oz.	1 to 2 dr.	1 to 2 dr.	10 to 40 gr.
Castor oil		1 pint.	1 pint.	2 to 4 f. oz.	2 to 4 f. oz.	1 to 2 f. oz.
Catechu		1 to 3 dr.	2 to 6 dr.	1 to 2 dr.	1 to 2 dr.	4 to 20 gr.
Chamomile	Flowers	1 to 2 oz.	1 to 2 oz.	1 drachm	1 drachm	
Charcoal	Powdered	4 to 8 dr.	1 ounce	2 to 3 dr.	2 to 3 dr.	10 to 60 gr.
Chloral, hydrate		1 to 2 oz.	1 to 2 oz.	1 to 3 dr.	1 to 3 dr.	10 to 30 gr.
Chloroform		1 to 2 f. dr.	1 to 2 f. dr.	20 to 40 m.	20 to 40 m.	5 to 10 m.
Chloric ether		1 f. oz.	2 f. oz.	2 to 4 f. dr	2 to 6 f. dr.	1 to 2 f. dr.
Cinchona bark	Powdered	2 to 4 dr.	1 to 2 oz.	1 to 4 dr.	1 to 4 dr.	20 to 60 gr.
Cod liver oil		2 f. oz	2 to 4 f. oz.	1 f. oz	4 to 8 f. dr.	1 to 4 f. dr.
Colchicum	Powdered	30 to 60 gr.	1 to 2 dr.	10 to 25 gr.	2 to 8 gr.	2 to 8 gr.
Copper	Sulphate	1 to 2 dr.	1 to 4 dr.	20 to 30 gr.	5 to 10 gr.	1/4 to 2 gr.
Creasote		20 to 40 m.	1/2 to 2 dr.	10 to 20 m.	5 to 10 m.	1 to 3 m.
Croton	Seeds	30 to 36 gr.	45 to 60 gr.	9 to 12 gr.	6 to 9 gr.	3 to 6 gr.
"	Oil	15 to 25 m.	1/2 to 3 f. dr.	5 to 10 m.	5 to 10 m.	2 to 3 m.
Digitalis leaves	Powdered	10 to 30 gr.	30 to 60 gr.	8 to 15 gr.	2 to 10 gr.	1 to 4 gr.

		Horses.	Cattle.	Sheep.	Hogs.	Dogs.
Ergot of rye		½ to 1 oz.	½ to 1 oz.	1 drachm.	1 drachm	1 drachm
Ether	Alcoholic solution	1 to 2 f. oz.	2 to 3 f. oz.	2 to 3 f. dr.	2 to 4 f. dr.	30 to 60 m.
Fern root	Powdered	1 pound	1 pound	3 to 4 oz.		2 ounces
Gall nuts	Powdered	4 to 6 dr.	1 to 2 oz.	30 to 60 gr.	30 to 60 gr.	5 to 10 gr.
Gum arabic		2 to 3 oz.	2 to 3 oz.	1 ounce		20 to 40 gr.
Gamboge		4 to 8 dr.	20 to 30 gr.			
Gentian root	Powdered	4 to 8 dr.	1 to 2 oz.	1 to 3 dr.	30 to 60 gr.	5 to 20 gr.
Ginger	"	4 to 8 dr.	1 to 3 oz.	1 to 2 dr.	30 to 60 gr.	10 to 30 gr.
Hyoscyamus	Tincture	3 f. oz.	3 f. oz.	2 f. dr.	2 f. dr.	
"	Succus	1½ f. oz.	1½ f. oz	1 f. dr.	1 f. dr.	
"	Extract	1 f. dr.	1 f. dr	15 m.	15 m.	
Hyoscyamine		1 grain.	1 grain.	⅛ grain.	⅛ grain.	
Hydrochloric acid	Dilute	½ to 2 f. dr.	2 to 4 f. dr.	15 to 20 m.	15 to 20 m.	3 to 10 m.
Hemlock	Succus	10 to 15 f. oz.	10 to 15 f. oz.	1 to 3 f. oz.	1 to 3 f. oz.	1 to 4 f. dr.
"	Tincture	2 to 3 f. oz.	2 to 3 f. oz.			2 to 3 f. dr.
Hemlock	Extract	1 to 2 dr.	1 to 2 dr.	1 to 5 gr.	1 to 5 gr	1 to 5 gr.
Iodine	Crystals	20 to 60 gr.	30 to 90 gr.	15 to 40 gr.	10 to 20 gr.	3 to 8 gr.
Ipecacuan	As an emetic					20 to 30 gr.
"	As a diaphoretic	1 to 3 dr.	1 to 3 dr.	30 to 60 gr.		10 to 15 gr.
Iron	Sulphate	1 to 3 dr.	2 to 4 dr.	20 to 30 gr.	10 to 20 gr.	5 to 10 gr.
" perchloride	Alcoholic solution	1 to 2 f. oz.	1 to 2 f. oz.	20 to 30 m.	10 to 20 m.	3 to 10 m.

		Horses.	Cattle.	Sheep.	Hogs.	Dogs.
Jaborandi		2 to 4 dr.	2 to 4 dr.	30 to 60 gr.	30 to 60 gr.	30 to 60 gr.
Jalap				1 to 4 dr.	1 to 2 dr.	
Juniper Oil	As a diuretic	1 to 2 dr.	1 to 2 dr.			5 to 10 m.
Lime	Quick lime	1 to 2 dr.	20 to 30 gr.			5 to 20 gr.
"	Carbonate	1 to 2 oz.	2 to 4 oz.	2 to 4 dr.	1 to 2 dr.	8 to 12 gr.
Lead, acetate		1 drachm.	1 drachm.	15 to 20 gr.	6 to 12 gr.	2 to 6 gr.
Linseed oil		½ to 1 pt.	1 to 2 pt.	6 to 8 f. oz.	6 to 8 f. oz.	1 to 2 f. oz.
Magnesia, sulphate		1 to 2 lb.	4 to 6 oz	4 to 6 oz	2 to 4 dr.	
Mercury, chloride of		20 to 60 gr.	20 to 60 gr.	10 to 30 gr.	10 to 30 gr.	2 to 3 gr.
Methylic, alcohol		½ to 1 f. oz.	½ to 1 f. oz.	1 to 2 f. dr.	1 to 2 f. dr.	10 to 20 m.
Mustard seed	Powdered	4 to 6 dr.	4 to 8 dr.	1 to 2 dr.	1 to 2 dr	10 to 20 gr.
Myrrh, gum		2 drachms.	2 drachms.	30 to 60 gr.	30 to 60 gr.	10 to 20 gr.
Morphia, acetate		3 to 10 gr.	3 to 10 gr.	½ to 2 gr.	½ to 2 gr.	⅛ to ½ gr.
Nitric acid	Medicinal	1 to 2 f. dr.	1 to 2 f. dr.	10 to 20 m.	10 to 20 m.	2 to 10 m.
Nux vomica	Powdered	1 drachm,	2 to 3 dr.	20 to 40 gr.	10 to 20 gr.	2 to 8 gr.
Opium	Tincture	1 to 3 f. oz.	1 to 3 f. oz.	2 to 6 f. dr.	2 to 6 f. dr.	15 to 40 m.
"	Powdered	1 to 2 dr.	2 to 4 dr.	10 to 60 gr.	10 to 30 gr.	1 to 6 gr.
Pepper, black		2 drachms.	3 drachms.	20 to 60 gr.	20 to 60 gr.	5 to 10 gr.
Podophyllin		1 to 2 dr.	1 to 2 dr.			1 to 2 gr.
Potassium	Carbonate	4 to 8 dr.	4 to 8 dr.	30 to 60 gr.	30 to 60 gr.	10 to 40 gr.
"	Iodide	2 to 6 dr.	2 to 6 dr.	20 to 60 gr.	20 to 60 gr.	5 to 15 gr.

		Horses.	Cattle.	Sheep.	Hogs.	Dogs.
Potassium	Nitrate	½ to 2 oz	1 to 2 oz	1 to 2 dr	30 to 60 gr	10 to 30 gr
"	Chlorate	1 to 2 dr	2 to 3 dr	20 to 60 gr	20 to 60 gr	5 to 15 gr
Prussic acid	Dilute	20 to 60 m	20 to 60 m	10 to 20 m	10 to 20 m	2 to 4 m
Quinine		10 to 20 gr	30 to 40 gr	5 to 10 gr	4 to 10 gr	1 to 5 gr
Quassia	Infusion	2 to 4 f. oz	2 to 4 f. oz	4 f. dr	4 f. dr	1 f. dr
Rhubarb root	Powdered	1 to 2 dr		1 drachm		20 to 30 gr
Strichnine		2 to 3 gr	3 to 6 gr	⅓ to 1 gr		$\frac{1}{30}$ to $\frac{1}{10}$ gr
Salicylic acid		1 to 2 dr	1 to 2 dr	10 to 15 gr		10 to 15 gr
Savin	Oil of	3 to 4 f. dr	3 to 4 f. dr			3 to 4 m
Silver, nitrate		5 to 10 gr	5 to 10 gr	2 to 4 gr	½ to 1 gr	$\frac{1}{8}$ to ½ gr
Sodium	Carbonate	2 to 4 dr	2 to 4 dr	20 to 60 gr	20 to 60 gr	10 to 20 gr
"	Sulphate	1 to 1½ lb		2 to 4 oz		
"	Sulphite	1 to 2 oz	1 to 2 oz	30 to 60 gr	30 to 60 gr	10 to 30 gr
"	Chloride	¾ to 1 lb		1 to 3 oz		
"	Chlorata	3 to 6 dr	3 to 6 dr	20 to 50 gr	20 to 50 gr	6 to 12 gr
Sulphur	As a laxative	3 to 4 oz	4 to 6 oz	1 to 2 oz	1 to 2 oz	6 drachms
Sulphuric acid	Dilute	1 to 2 f. dr	2 to 4 f. dr	20 to 60 m	10 to 20 m	2 to 6 m
Sulphurous acid	Medicinal	1 to 2 f. oz	1 to 2 f. oz	30 to 60 m	30 to 60 m	20 to 60 m
Sweet Spirits of Nitre		1 to 2 f. oz	1 to 4 f. oz	2 to 4 f. dr	1 to 2 f. dr	15 to 60 m
Tannic acid		⅓ to 2 dr	1 to 3 dr	15 to 30 gr	15 to 30 gr	2 to 20 gr
Tobacco		1 to 2 dr	1 to 2 dr	10 to 20 gr		5 to 10 gr

	Horses.	Cattle.	Sheep.	Hogs.	Dogs.
Turpentine, oil of	1 to 2 f. oz.	1 to 2 f. oz.	1 to 4 f. dr.	1 to 4 f. dr.	30 to 120 m.
Valerian root	2 to 4 oz.	2 to 4 oz.			1 to 2 dr.
Veratrum album	Powdered 30 to 60 gr.	30 to 60 gr.	20 to 30 gr.	20 to 30 gr.	2 to 6 gr.
Zinc, Oxide	2 to 4 dr.	2 to 4 dr.			5 to 10 gr.
" Sulphate	1 to 3 dr.	1 to 3 dr.	10 to 20 gr.		2 to 5 gr.

INDEX.